MICROSOFT PROJECT 2010 - I

Course Material

This 2-day course is for new and intermediate users of the MS Project scheduling application who want to get started on planning their projects in MS Project. Overall, the objective of the course is to make participants feel comfortable with Project 2010. At the end of this course the participant should be able to setup a project schedule from the WBS and identify task dependencies; enter duration and work estimates; identify and assign resources; edit and progress the schedule; and produce basic project reports. The course also discusses and demonstrates the MS Project scheduling formula and how to appropriately manipulate tasks to achieve the most effective schedule.

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Course Agenda

Day 1		Day2	
8:30 - 9:00	Personal Introductions	8:30 - 9:30	Entering Deadlines
9:00 - 9:30	Introduction to MS Project 2010	9:30 - 10:15	Entering Resources
9:30 - 10:00	Setting up a Project	10:15 - 10:30	BREAK
10:00 - 10:15	BREAK	10:30 - 11:30	Entering Assignments
10:15 - 11:00	Setting up a Project	11:30 - 12:30	LUNCH
11:00 - 11:30	Entering WBS	12:30 - 1:00	Assignments
11:30 - 12:30	LUNCH	1:00 - 2:00	Updating the Schedule
12:30 - 1:15	Entering WBS	2:00 - 2:15	BREAK
1:15 - 2:00	Entering Estimates	2:15 - 2:45	Updating the Schedule
2:00 - 2:15	BREAK	2:45 - 3:30	Reports
2:15 - 2:45	Entering Estimates	3:30 - 4:00	Exam and Evaluation
2:45 - 4:00	Entering Dependencies		

LESSON 1: INTRODUCTION TO MICROSOFT PROJECT 2010

Topic 1: What's New in MS Project 2010

Topic 2: A Dynamic Approach to Scheduling

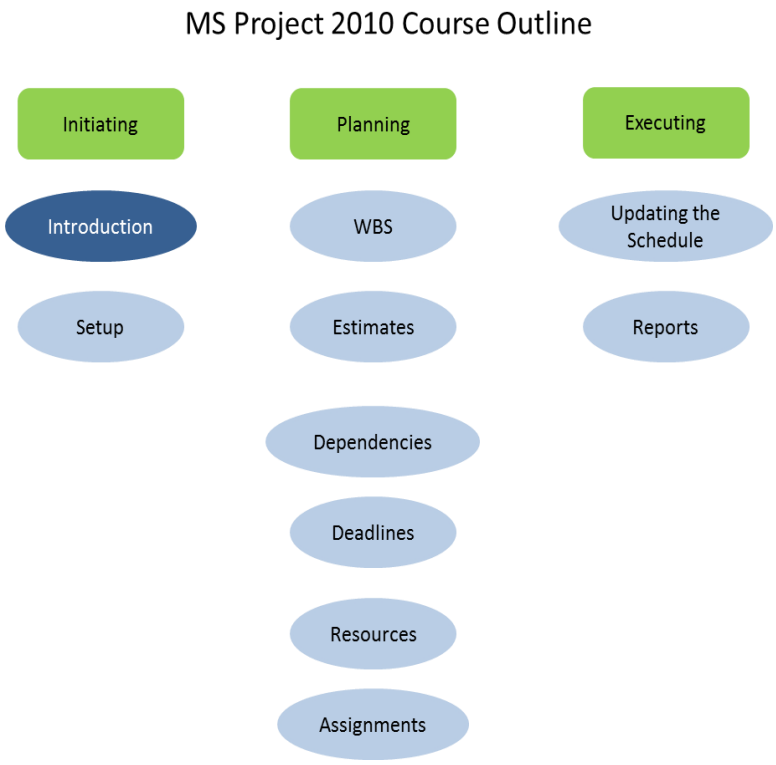
Topic 3: Course Structure

Student Learning Objectives

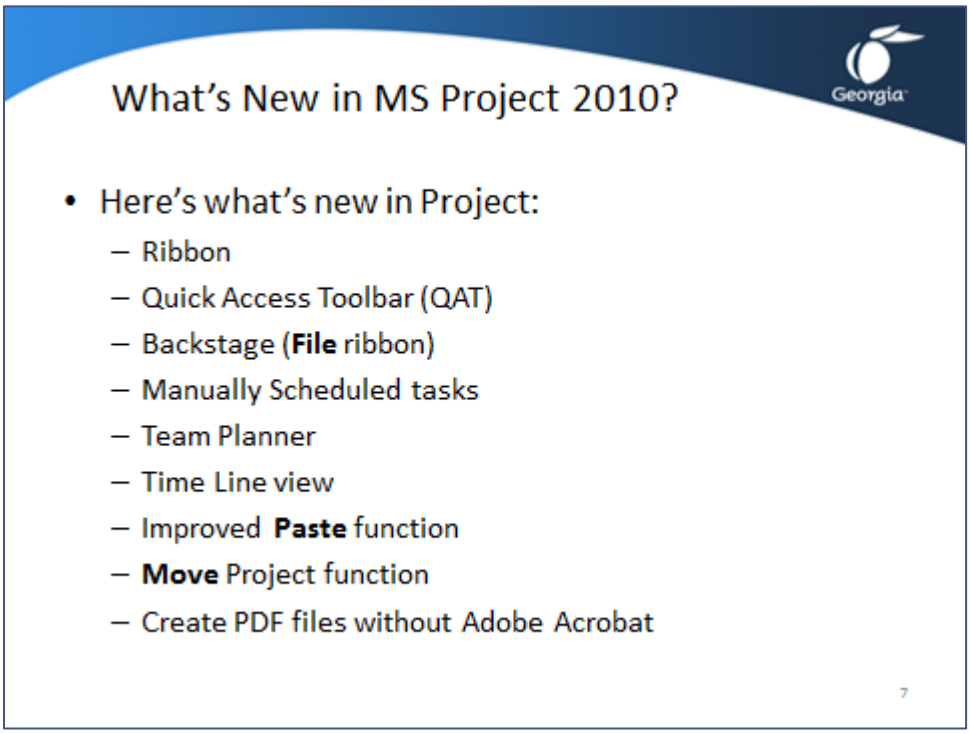
After completing this lesson you should be able to

- Understand the new features of Microsoft Project 2010
- Understand the principle of forecast and dynamic scheduling

Approximate Presentation time: 30 minutes



Topic 1: What's New in MS Project 2010



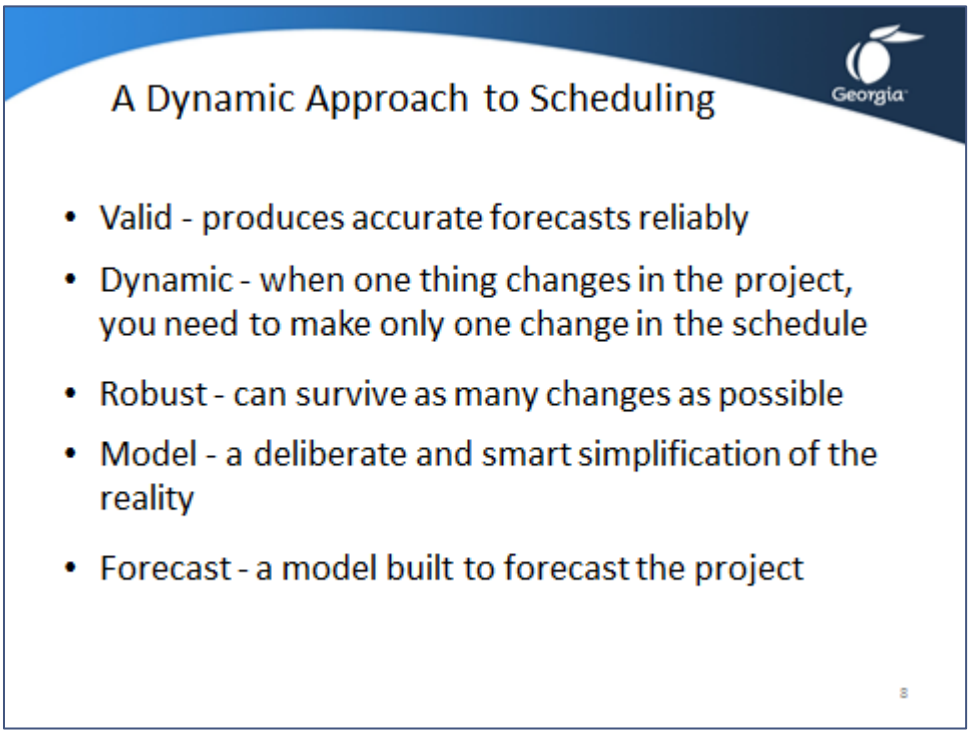
Project 2010 is a software application that helps you build a model of your project. It is a powerful tool that has grown in its usefulness for professional project managers. Like all tools, correct use requires knowledge and skill. This course is designed to assist you gain both. The software is not a magic beam that will grow a successful project by itself. A successful project results from a combination of executive support, competent project management, a committed team, and the right tools.

Here's what's new in Project 2010.

- **Ribbon** (*Fluent User Interface*)
  There are six ribbons in Project 2010: **File, Task, Resource, Project, View,** and **Format.** Ribbon is the common term used by most practitioners, but Microsoft uses the term *Fluent User Interface*.
- **Quick Access Toolbar** (QAT)
  The Quick Access Toolbar is always visible, unlike each ribbon. Buttons you put on the QAT are always accessible.
- Microsoft Office *Backstage* (**File** Ribbon)
  The backstage can be accessed by clicking File. It contains the file management features and all features of secondary use. The Options can now be found on the backstage.
- Status bar at the bottom of the screen:
  The status bar now provides more feedback and has some new interactive buttons as well as the popular zoom slider for zooming the timescale in or out.

- *Manually scheduled tasks*
  Manually scheduled tasks have a pushpin icon in the indicators column. This is the new default replacing Auto Scheduled tasks. Manually scheduled tasks give you the flexibility of Excel but the power of Project and allow you to start entering data into your MS Project schedule as soon as you receive them without having to complete the schedule. Your schedule can be your notepad much earlier during the planning phase. Manually scheduled tasks do not automatically move out when they have dependencies and will keep their dates as you entered them. Manually scheduled tasks even allow you to enter notes in **Start** and **Finish** date fields, for example: *discuss with Harry*.
- Team Planner
  The Team Planner view is a workload chart in which you can easily drag workloads around. The bars depict workloads for the resource. Their position in the timescale represents when the workloads are scheduled.
- Time Line view
  The Time Line view provides an overview of all important milestones and tasks of your choice. You can paste it in a Power Point slide as a Microsoft Drawing object that you can continue to manipulate in Power Point.
- Resource Graph view
  The Resource Graph view can now also chart proposed work, availability and cumulative numbers.
- *Paste* is improved
  Tasks copied between MS Office applications now keep their formatting. An indented task list copied from MS Word will also keep its indentation structure in Project 2010.
- *Move Project*
  Move Project is a new feature found on the **Project** ribbon. When you move a project, MS Project adjusts all the hard dates in the schedule relative to the new start date you enter.
- Create PDF files without Adobe Acrobat
  MS Project now allows printing directly to PDF files.

Topic 2: A Dynamic Approach to Scheduling



A Schedule is a Valid, Dynamic and Robust Model to Forecast

Valid
A valid schedule is a schedule that produces accurate forecasts reliably. Most project managers create schedules to better forecast their projects.

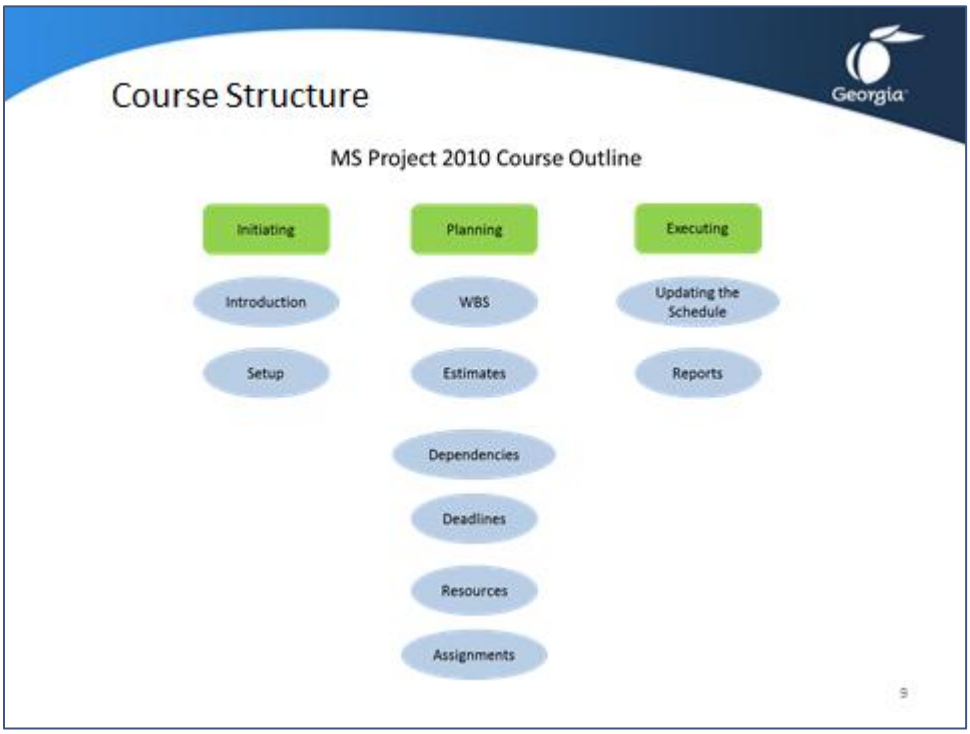
Dynamic
A dynamic schedule updates itself as much as possible. A dynamic schedule is set up to come as close as possible to realizing when one thing changes in the project, you need to make only one change in the schedule, then all forecasts in the entire schedule are immediately recalculated by the software and are accurate again.

Robust
A robust model is a model that can survive as many changes as possible, even extreme circumstances, with as few necessary adjustments as possible.

Model
A model is a deliberate and smart simplification of the reality. A schedule should be an intentional and intelligent simplification of the project. The art of scheduling is capturing only what is important in the project.

Forecast
The schedule is a model built to forecast the project. The biggest benefit of the schedule is to continuously forecast your project. Stakeholders are interested in accurate forecasts.

Topic 3: Course Structure



It is recommended that you follow the process below as your own business process to create and manage your schedules.

Lesson Title	Corresponding Process Sentences
Setup	Setup a new schedule and configure its options
WBS	Create the Work Breakdown Structure
Estimates	Estimate task durations or efforts (work) and enter them
Dependencies	Create a complete and correct network of dependencies to create a dynamic model of the project
Deadlines	Enter deadlines and perhaps some constraints or task calendars
Resources	Define and enter resources
Assignments	Assign resources to the detailed tasks
Updating the Schedule	Set the baseline once, maintain it if needed, and update the schedule so it forecasts the project at all times
Reports	Customize reports to the needs of project stakeholders once, and then generate them at each status period

Lesson 1 Checklist: Learning Objectives Recap

- **Understand what is new in MS Project 2010**
  - Ribbon (*Fluent User Interface*)
  - Quick Access Toolbar (QAT)
  - Microsoft Office *Backstage* (File Ribbon)
  - Status bar at the bottom of the screen:
  - *Manually scheduled tasks*
  - Team Planner
  - Time Line view
  - Resource Graph view
  - *Paste* is improved
  - *Move Project*
  - Create PDF files without Adobe Acrobat
- **A Dynamic Approach to Scheduling**
  - Valid - produces accurate forecasts reliably
  - Dynamic - when one thing changes in the project, you need to make only one change in the schedule
  - Robust - can survive as many changes as possible
  - Model - a deliberate and smart simplification of the reality
  - Forecast - a model built to forecast the project
- **Course Structure**
  - Setup - Setup a new schedule and configure its options
  - WBS - Create the Work Breakdown Structure
  - Estimates - Estimate task durations or efforts (work) and enter them
  - Dependencies - Create a complete and correct network of dependencies
  - Deadlines - Enter deadlines and perhaps some constraints or task calendars
  - Resources - Define and enter resources
  - Assignments - Assign resources to the detailed tasks
  - Reports - Customize reports to the needs of project stakeholders
  - Updating the Schedule - Update the schedule so it forecasts the project at all times

Notes

LESSON 2: SETTING UP A PROJECT

Topic 1: Opening, Saving, and Closing a Project

Topic 2: The MS Project 2010 Interface

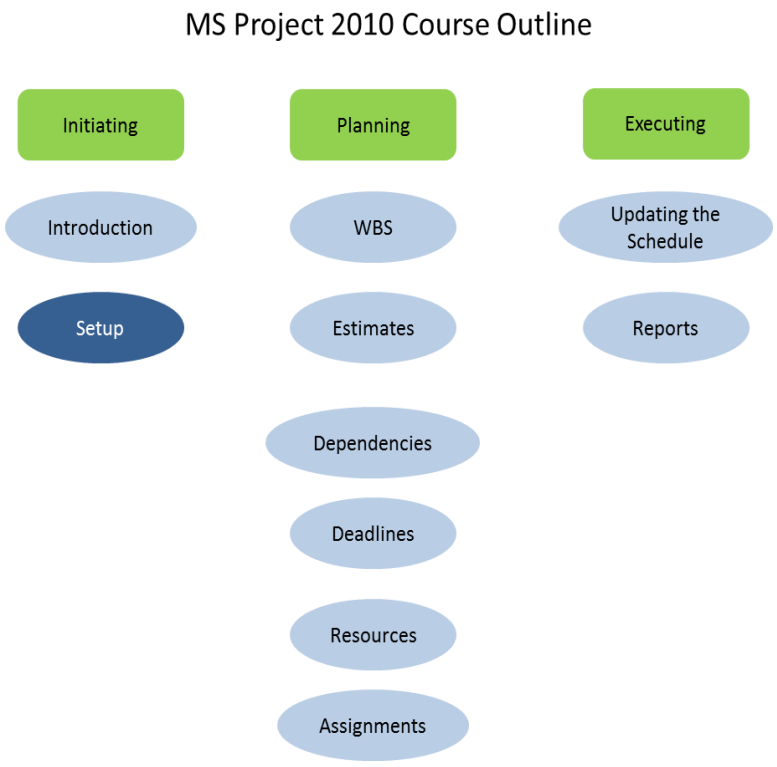
Topic 3: Setting up a New Schedule

Student Learning Objectives

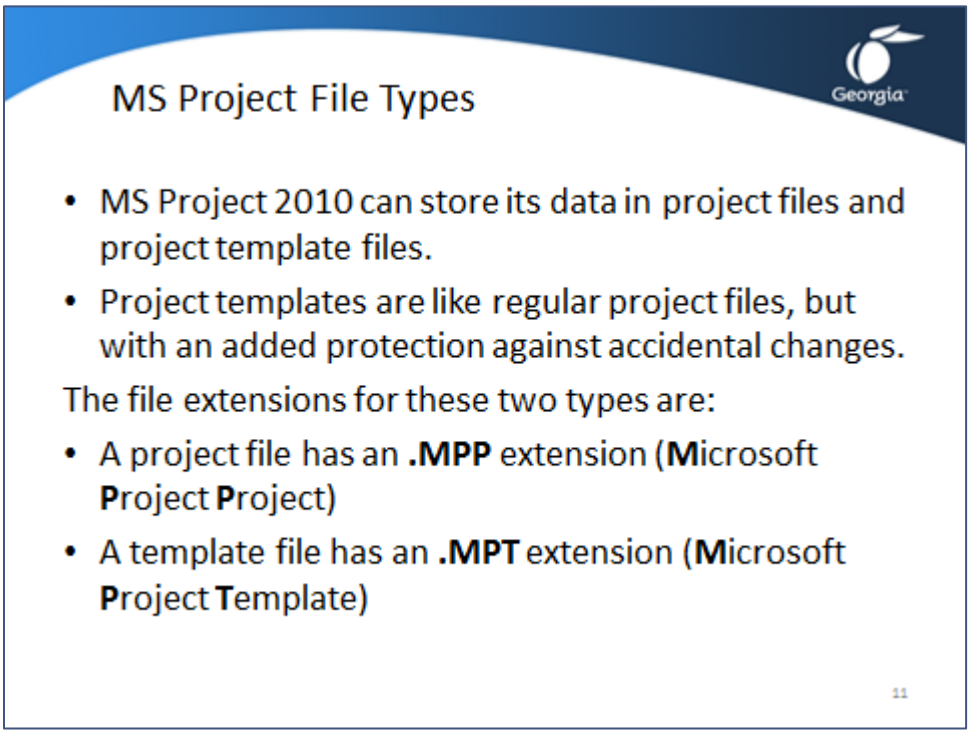
After completing this lesson you should be able to

- Understand the MS Project interface
- Understand what data MS Project stores and where
- Understand how to set up a new project
- Understand the best practices for setting up new project schedules

Approximate Presentation time: 1 hour 15 minutes



Topic 1: Opening, Saving, and Closing a Project



File Types in MS Project 2010

MS Project 2010 can store its data in project files and project template files among other file types. Project templates are like regular project files, but with an added protection against accidental changes. Templates are commonly used in organizations that run similar projects over and over. Think of a template as a standardized schedule.

The file extensions for these two types are:

- A project file has an **.MPP** extension (**M**icrosoft **P**roject **P**roject)
- A template file has an **.MPT** extension (**M**icrosoft **P**roject **T**emplate)

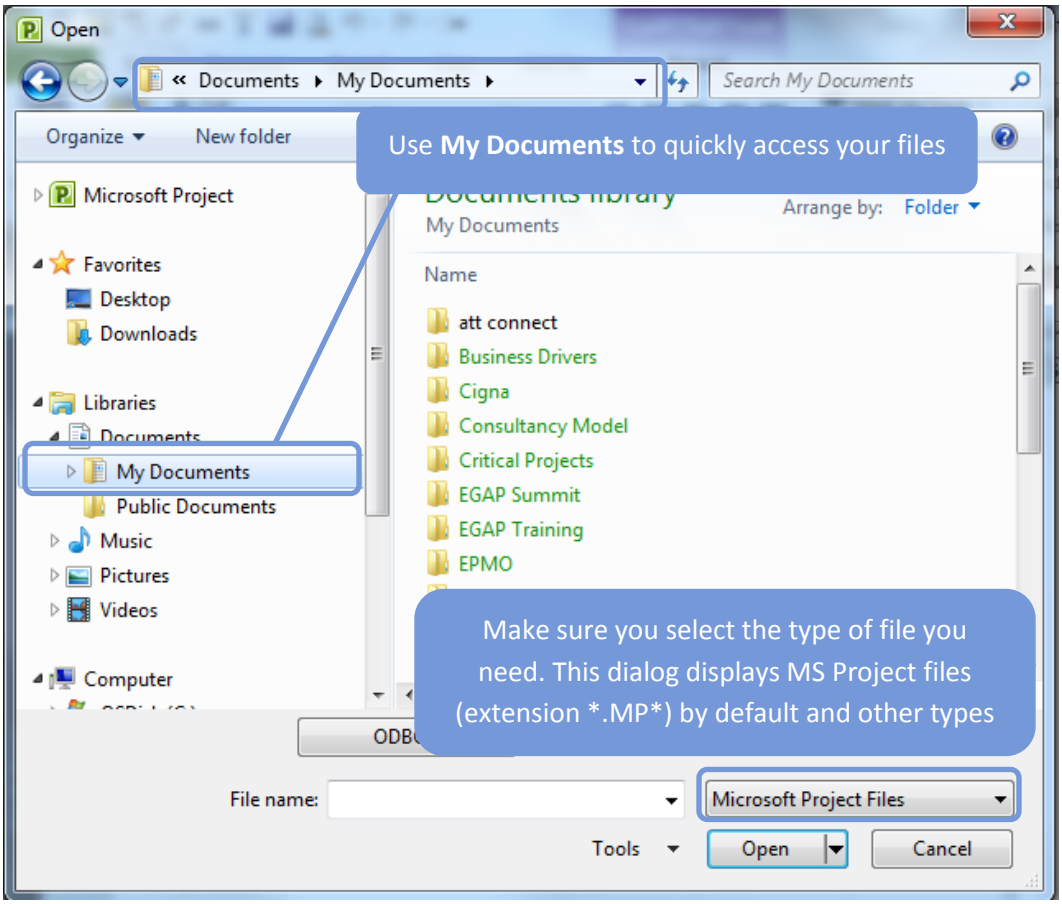
A special template exists, called *Global.MPT*, which is the default template file. When MS Project is started, this *Global.MPT* is opened. The *Global.MPT* is always open when MS Project is running. It contains all the default objects, like views, tables and filters that you use for reporting purposes.

The difference between a *project template* and the *Global.MPT* template is that the *Global.MPT* cannot contain schedule data, for example tasks.

Demonstration: Opening, Saving, and Closing a Project

Opening a Project File in MS Project 2010

1. Start MS Project
2. Click ribbon **File**, click Open - the **Open** dialog appears:

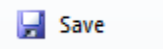


3. Navigate to the file to open.
4. Double-click on the name of the file to open.
   OR

   Single-click on the file name and click *Open*. The drop-down list on the button also allows you to **Open read only** or **Open as Copy**.

Note: If the file was opened recently, you can more easily open it: Click the **File** ribbon and click **Recent** and then double-click the file to open. You can even pin a file to the top of the list by clicking its pushpin button behind the file name.

Saving Changes in an Existing MPP file

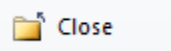
1. Click ribbon **File** and click 

.

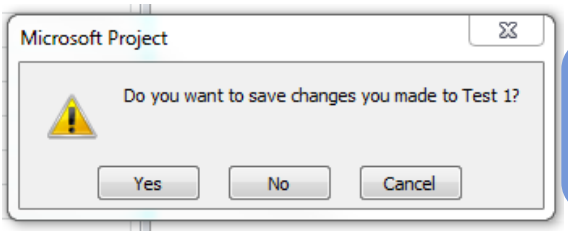
2. If your file exists already, the file on your hard disk will be updated with the changes. If the file does not exist, the **Save As** dialog will appear automatically.

Note: There is an **Auto Save** option that saves your schedule every so many minutes, which you indicate in ribbon **File**, **Options**, tab **Save**.

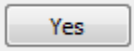
Closing a File

1. Click ribbon **File** and click 

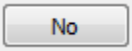
. If you have made changes to an open project, MS Project will prompt you to save changes and the Microsoft Project dialog appears.



You never need to be afraid of losing data when closing a file, because MS Project will prompt you to save it.

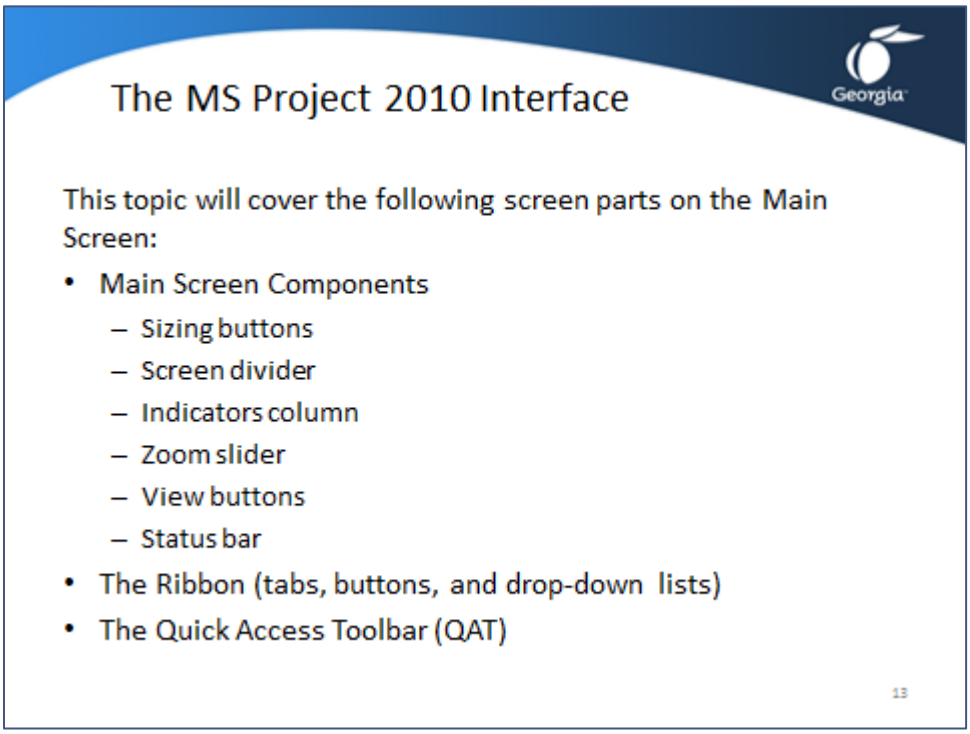
2. To save your changes, click 

, and the **Save As** dialog appears if the project has not been saved before.

   To discard changes, click 

   To interrupt closing the file, click 

Topic 2: The MS Project 2010 Interface



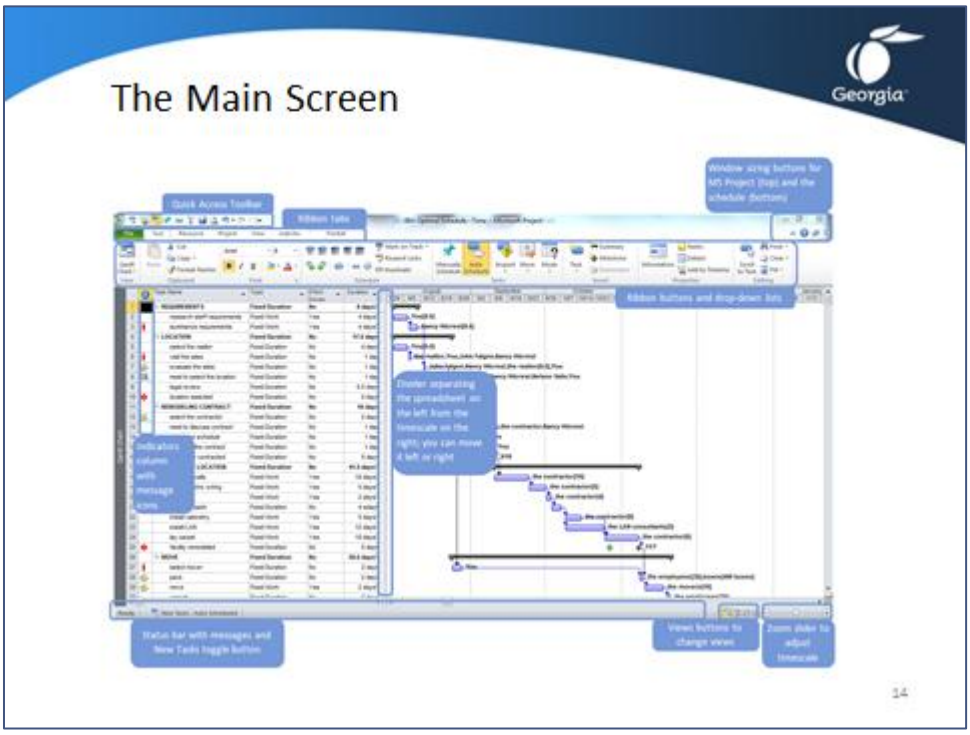
The Main Screen

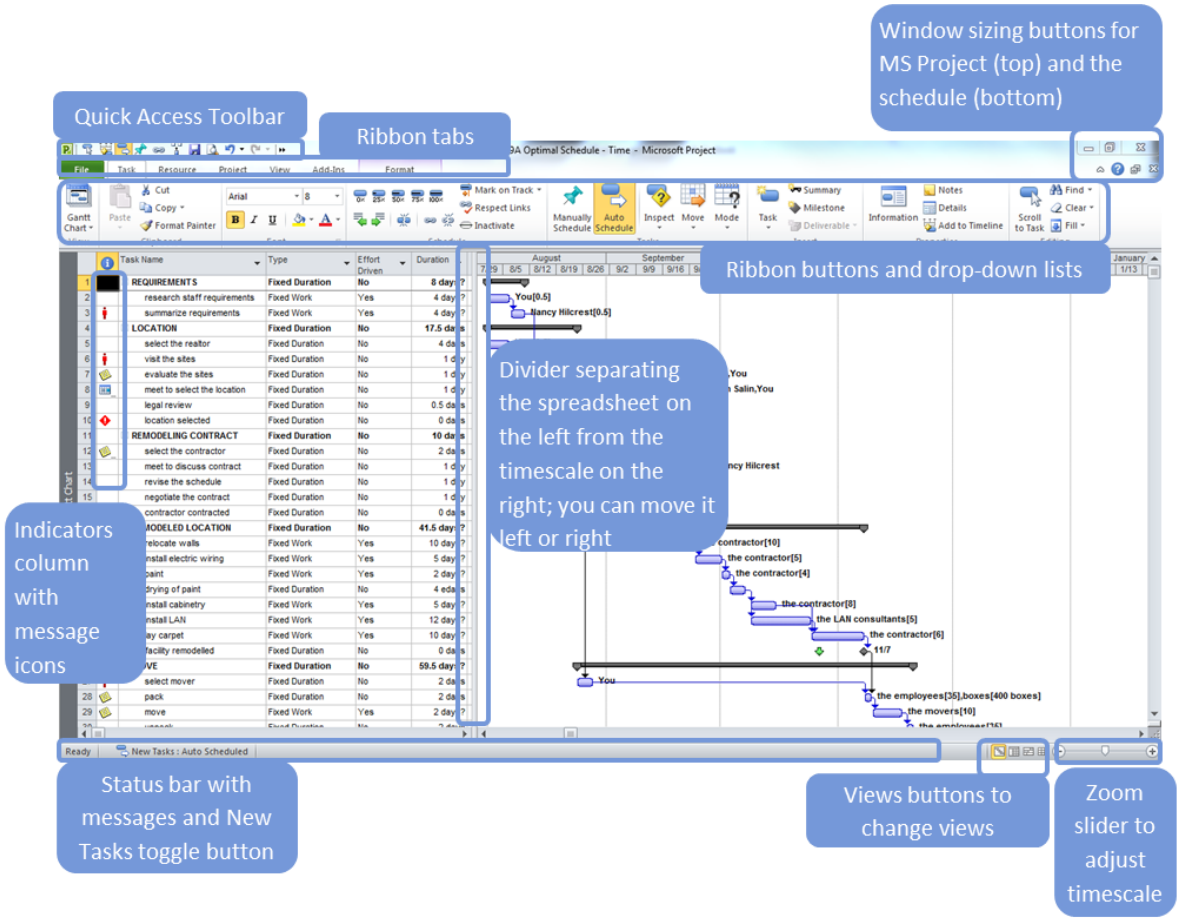
MS Project has many different screen areas that pop up when they are needed. This course will not discuss all the interface functions. Some will be discussed in the MS Project II class. You will need to know the names of the screen parts which are labeled in the following screenshot.

This topic will cover the following screen parts on the Main Screen:

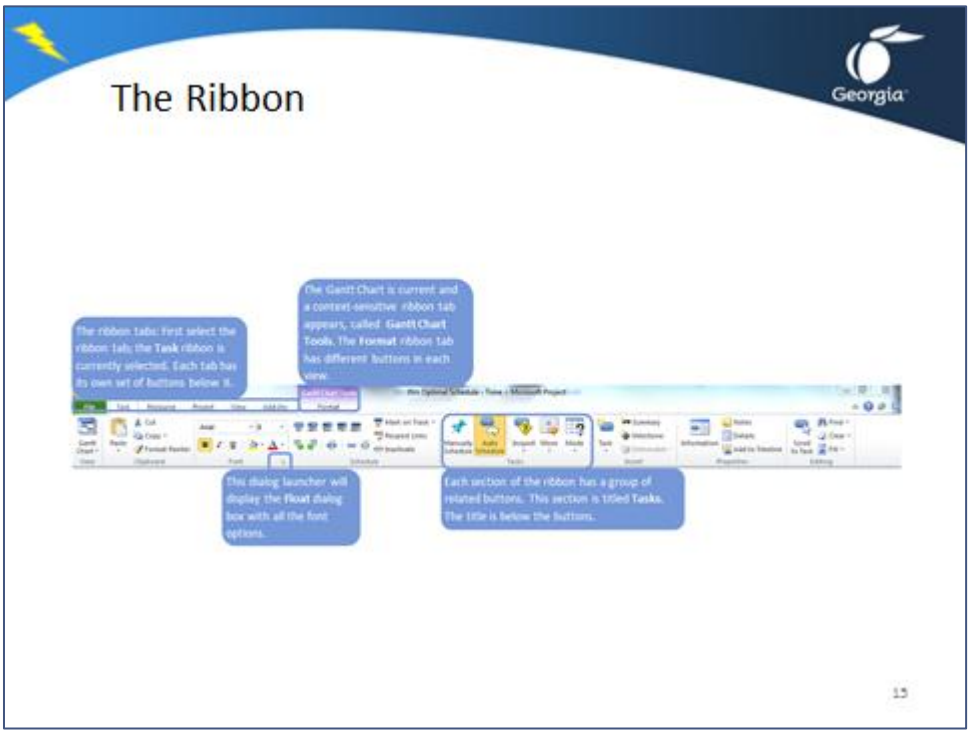
1. Main Screen Components
    a. Sizing buttons
    b. Screen divider
    c. Indicators column
    d. Zoom slider
    e. View buttons
    f. Status bar
2. The Ribbon (tabs, buttons, and drop-down lists)
3. The Quick Access Toolbar (QAT)

Topic 2: The MS Project 2010 Interface – The Main Screen





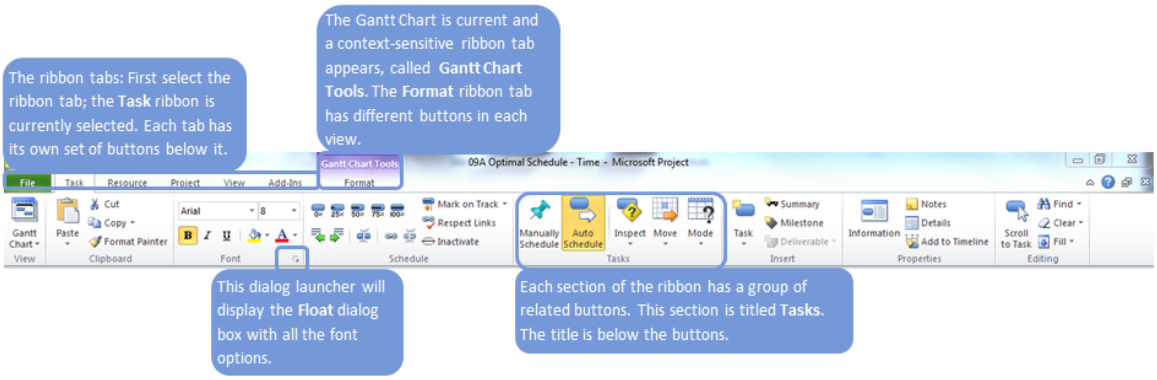
Topic 2: The MS Project 2010 Interface – The Ribbon



The Ribbon

The ribbon is a new interface that makes Project 2010 more intuitive. Frequently used features have bigger buttons in a more prominent place on the ribbon.

This topic will cover the major components of the ribbon.



Ribbon Tabs: Each tab looks like a ribbon, and that is what we will call it.
The **Format** ribbon is view-specific.

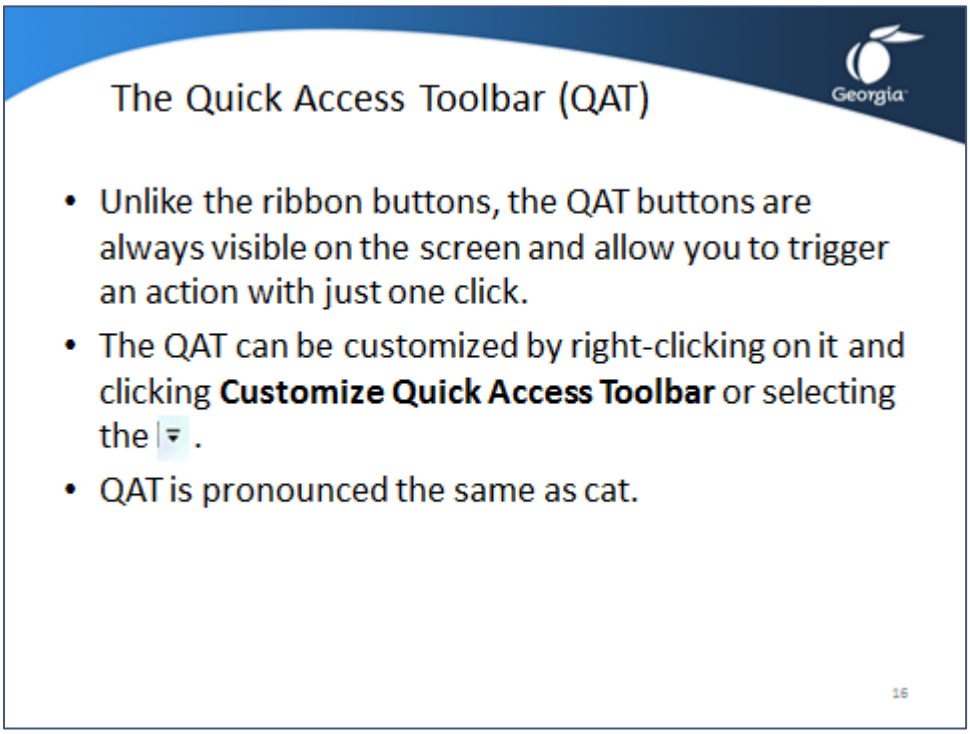
Ribbon Groups: Each section on a tab displays the group of related items. Each group has a title that is displayed at the bottom of the section.

Ribbon Commands: A ribbon command can be a button or a drop-down list. Lists can be recognized by a triangle button  . A button will immediately execute an action, whereas a list will require an extra click to select an item from the list and trigger an action.

Ribbon dialog launcher: When a ribbon does not display all buttons, a dialog launcher button  will allow you to display a dialog that provides all options.

Ribbon backstage: The **File** ribbon is special; it gives you access to the so-called backstage that has all file commands (save, open, close, new, print) and also the help system, the options, the organizer, and templates.

Topic 2: The MS Project 2010 Interface – The Quick Access Toolbar (QAT)



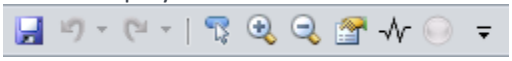
The Quick Access Toolbar (QAT)

The Quick Access Toolbar (QAT) is in the top left corner of the screen and looks like this by default:

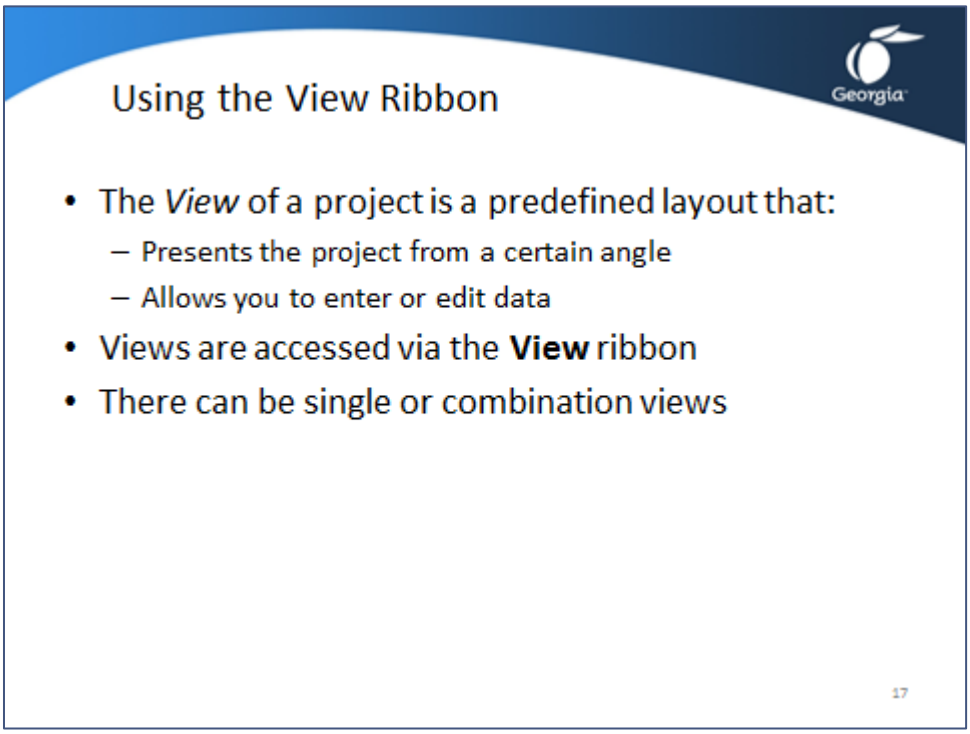
Unlike the ribbon buttons, the QAT buttons are always visible on the screen and allow you to trigger an action with just one click. The QAT can be customized by right-clicking on it and clicking **Customize Quick Access Toolbar** or selecting the . We recommend you consider adding the following buttons using the **All commands** list;

- **Scroll to task** to move bars or numbers into view
- **Zoom in** and **Zoom out**
- **Advanced Document Properties** to see **Properties** dialog
- **Project Statistics** to see project-level data
- **Print Preview**
- **Insert Page Break**

If you like your custom QAT a lot, you can display it below the ribbon: Show below the Ribbon. (QAT is pronounced the same as cat.)



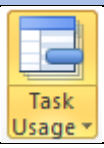
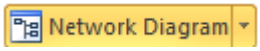
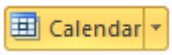
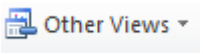
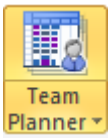
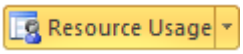
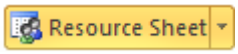
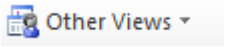
Topic 2: The MS Project 2010 Interface – Views



Using the View Ribbon

The *View* of a project is a predefined layout that presents the project from a certain angle. The views you allow you to enter or edit data, review or report your project. You can access the views by clicking the **View** ribbon.

View	View Ribbon Button	Shows
Gantt Chart	Section **Task Views, Gantt chart** 	The tasks and their task bars' over time, plus spreadsheet columns.
Tracking Gantt	Section **Task Views, Tracking Gantt** 	Two bars for each task in this view: The most recent update of the schedule and the original schedule (baseline) if the baseline is set.
Task Usage	Section **Task Views, Task Usage**	Tasks with their assigned resources and the effort or cost over time

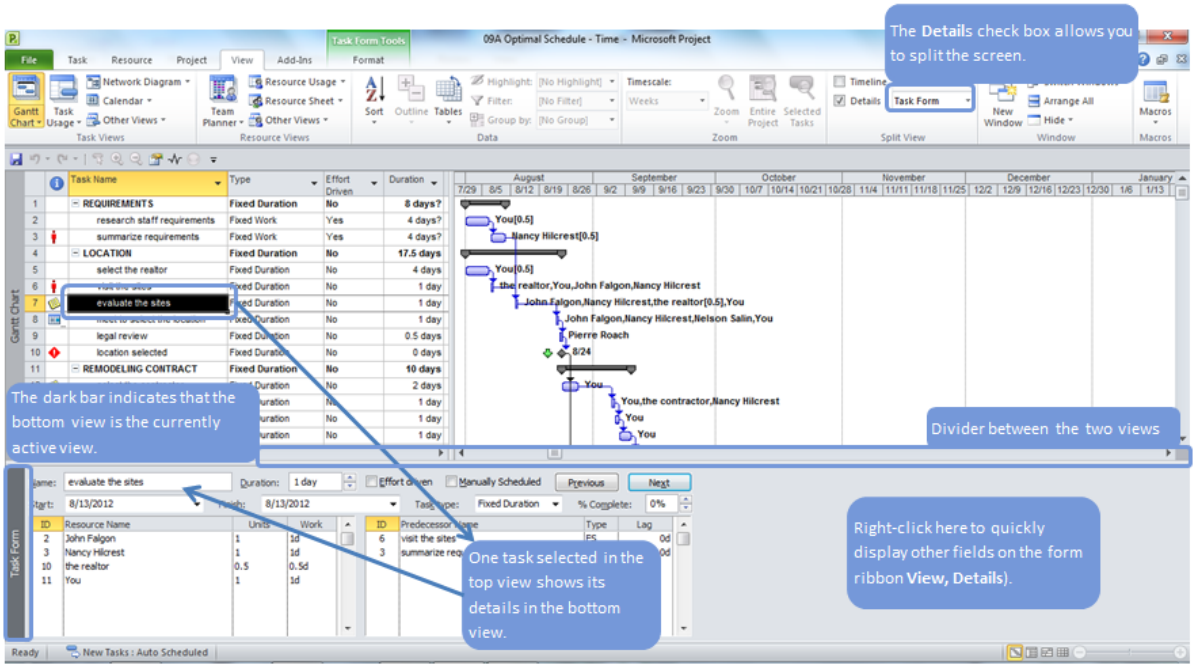
View	View Ribbon Button	Shows
		
Network Diagram	Section **Task Views,** 	The network of dependencies between tasks (dependencies are shown as arrows)
Calendar	Section **Task Views,** 	The tasks shown as bars on a calendar
Timeline	Section **Task Views,**  , Timeline	The Timeline view can display phases and milestones on one timeline bar to summarize the project. It appears as the top view.
Team Planner	Section **Resource Views,** 	The Team Planner view facilitates allocating tasks to resources while keeping as eye on their workloads.
Resource Usage	Section **Resource Views,** 	Resources with their assigned tasks with the workloads or cost over time.
Resource Sheet	Section **Resource Views,** 	The spreadsheet with resource information.
Resource Graph	Section **Resource Views,**  , Resource Graph	The workloads for resources in a bar chart format.

Single View versus Combination View

A single view is a one-view screen. The views shown on the previous pages are single views. A combination view is a screen with two views. A combination view consists of a top and a bottom view.

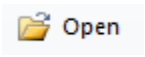
The bottom view only shows information pertaining to the tasks (or resources) that you selected in the top view. This interaction between top and bottom view can be very useful for data entry with a sheet view in the top and a form view in the bottom. Form views allow you to enter detail information.

Here is an example of a combination view, the **Task Entry** view. This view displays the **Gantt Chart** in the top and the **Task Form** in the bottom.



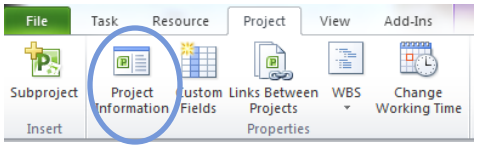
Exercise 2.1: Working with the MS Project 2010 Interface

Open the Exercise 2 MPP file

1. Start MS Project
2. Click ribbon **File**, click 

- the **Open** dialog appears
3. Navigate to the **Exercise 2** file and double-click the name.

Exploring the Main Screen



1. Locate the **Ribbon** and click the **Project** tab.
2. Locate the **Properties** ribbon group, click on **Project Information**.
   What is the **Project Start Date**? _____
3. Click 

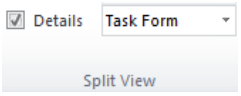
.
4. Locate the **QAT**, click the  button. Click **Show Above the Ribbon**.

Exploring Views

1. Click the **View** ribbon tab, locate **Task Views** section.
2. Click **Gantt Chart** dialog launcher 

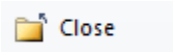
. Select **Tracking Gantt**.
3. Toggle back to the **Gantt Chart** view by repeating step 2 and selecting **Gantt Chart**.

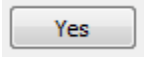
Exploring Combination Views

1. From the **View** ribbon tab, locate the **Split View** section.
2. Select **Details** option 

.
3. In the top view select task # 12.
4. What is the **Predecessor Name** in the Task Form view? _____
5. Unselect the **Details** option to return to a single view.

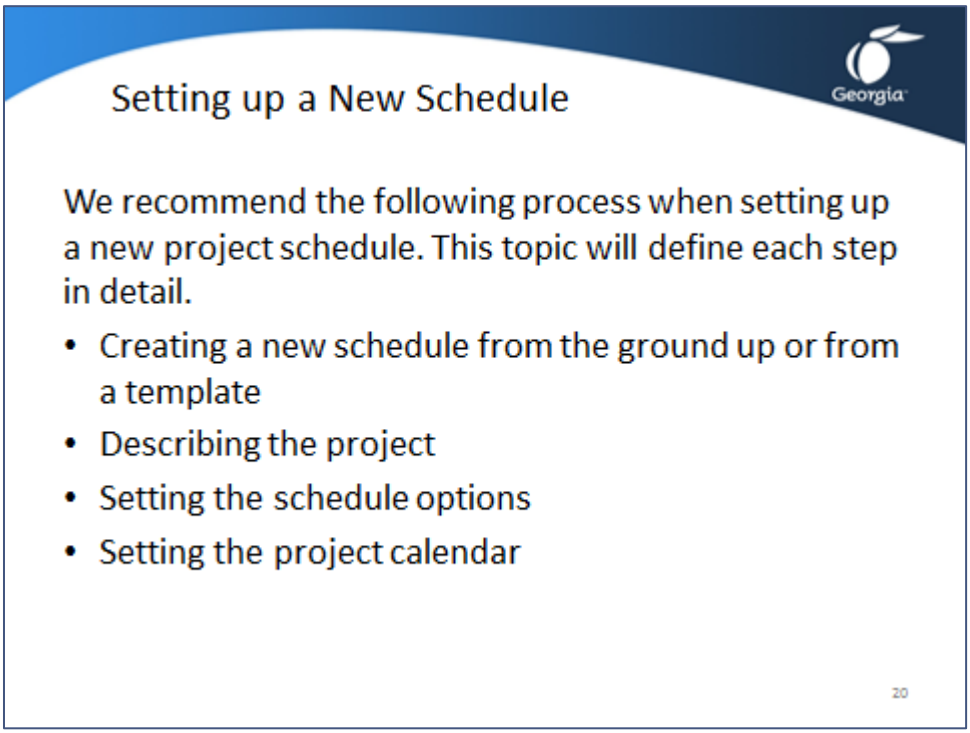
Close the Project File

1. Select the **File** ribbon tab.
2. Click 

.
3. Select 

on the Microsoft Project dialog box.

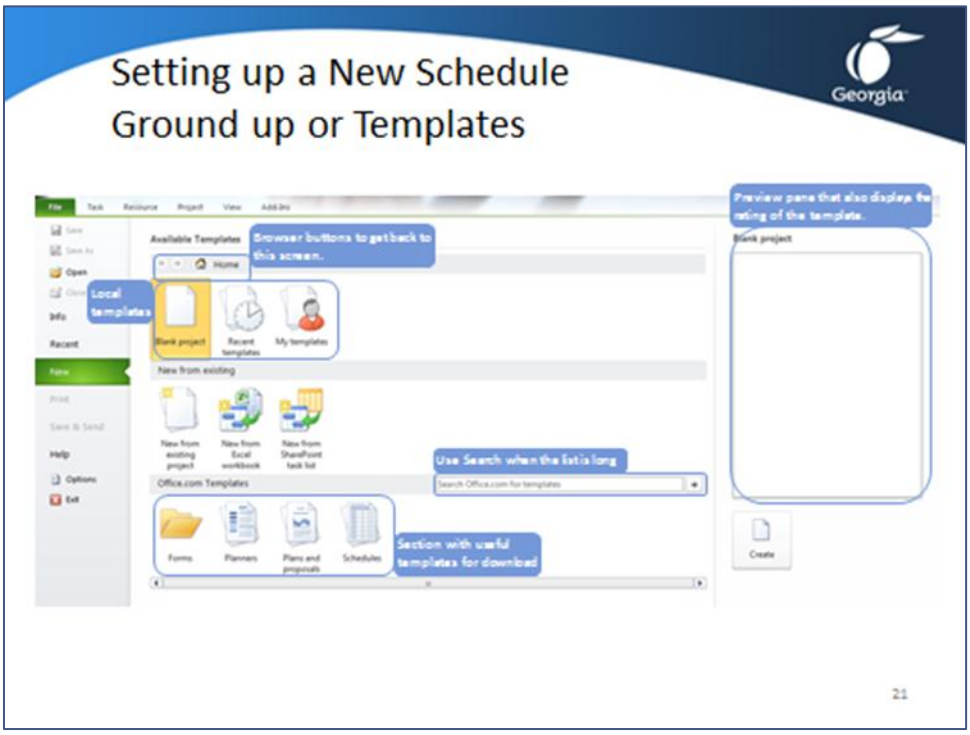
Topic 3: Setting Up a New Schedule



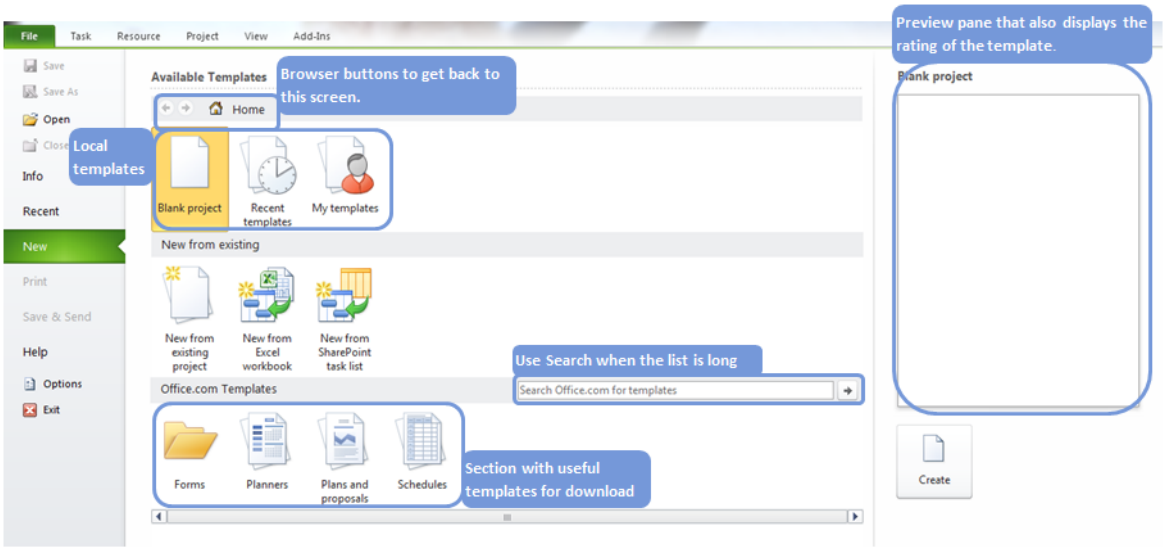
We recommend the following process when setting up a new project schedule. This topic will define each step in detail.

- Creating a new schedule from the ground up or from a template.
- Describing the project
- Setting the schedule options
- Setting the project calendar

Topic 3: Setting Up a New Schedule – Ground up or Template



Click ribbon tab **File** and click New - the following screen appears:

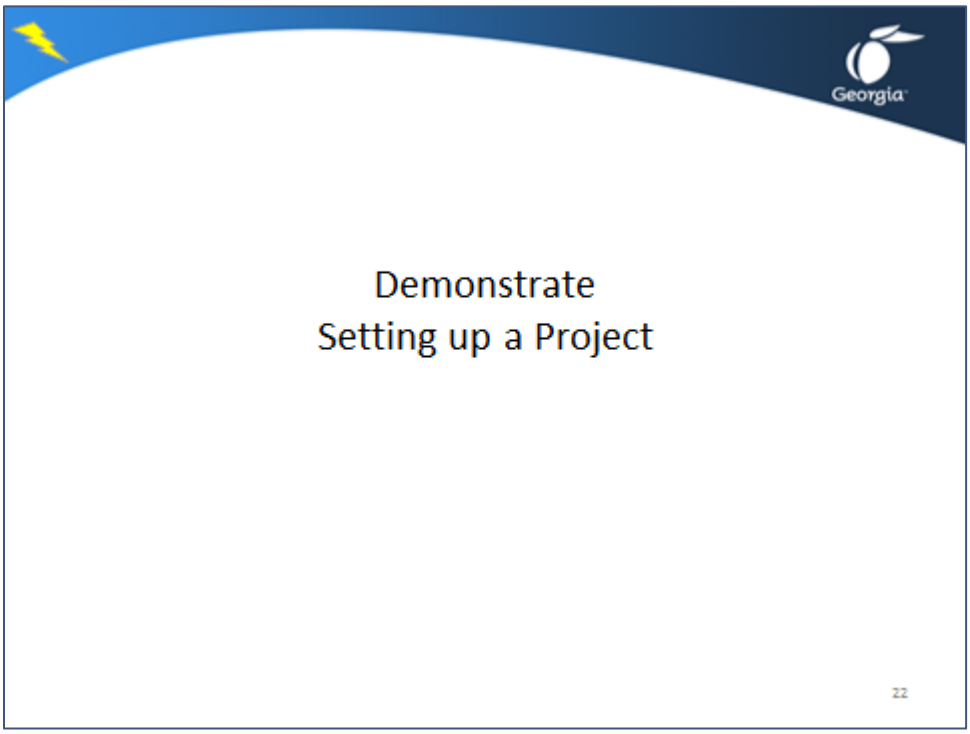


You can create a new **Blank Project** or jump start your project with:

- **Recent templates**; Templates you have recently accessed
- **My Templates**: templates you have downloaded from Office.com.
- **New from existing project**: reuse an existing project.

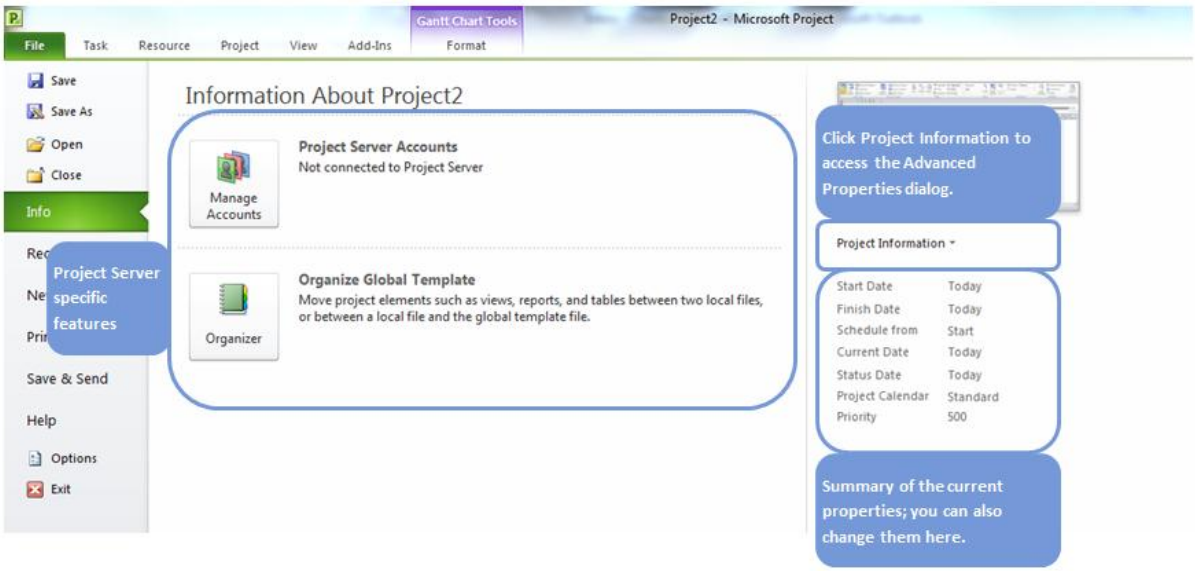
- **New from Excel workbook**: this requires you to create a map to tell MS Project in which fields the data from Excel need to be loaded. You can also copy straight from Excel, then lay out the columns similarly in MS Project and paste.
- **Office.com Templates**: Project 2010 does not come with out-of-the-box templates, but the list of templates on Office.com will keep growing.

Topic 3: Setting Up a New Schedule – Describing the Project

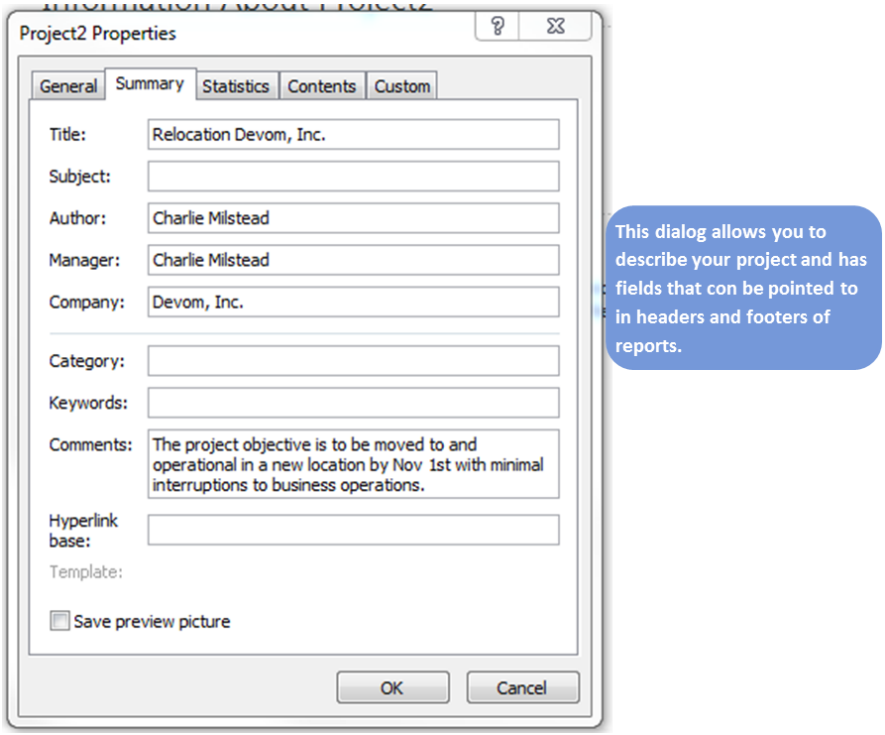


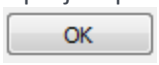
Project Properties

1. Open the project file **Demo Lesson 2 Project Setup**.
2. Click ribbon **File** and click Info - the following screen appears:



3. Click list button **Project Information** (on the right side of the screen) to display its drop-down menu and select **Advanced Properties** – the following dialog appears:

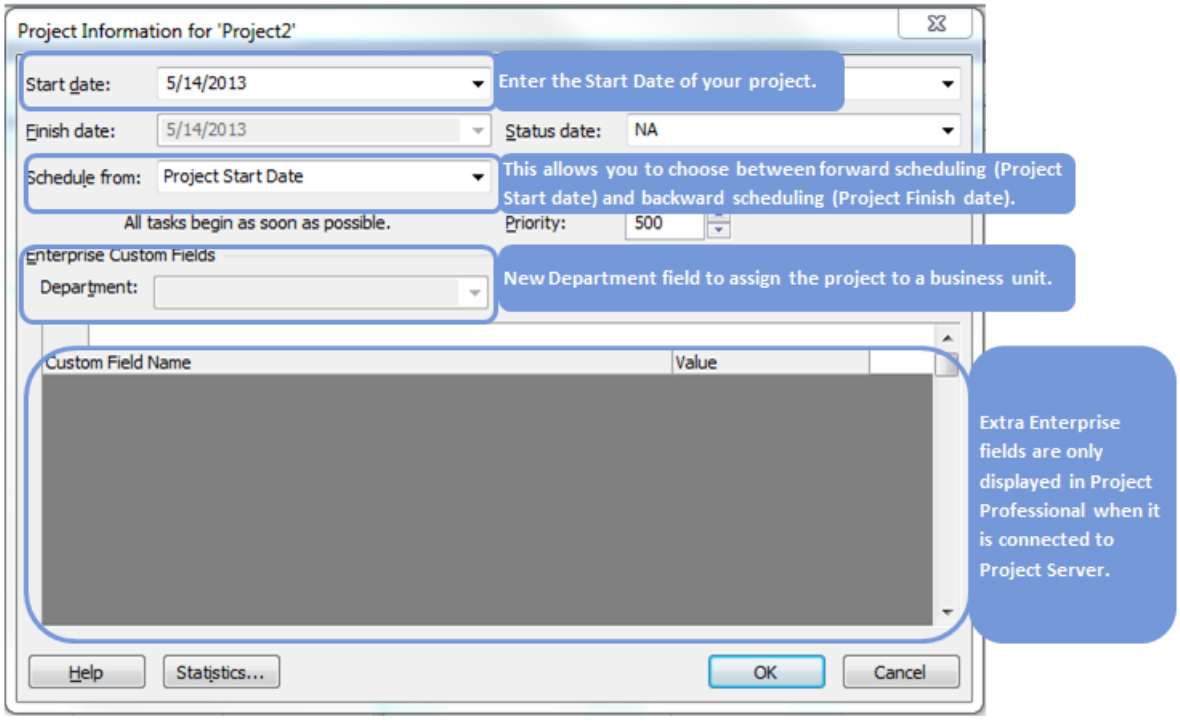


4. Click the tab **Summary** and in this dialog:
    a. In the field **Title**, enter the name of the project
    b. Enter your name and the **Author** and/or **Manager** and
    c. In the **Comments** field, enter the project objective or a description of the final project product.
5. Click 

.

Entering the Project Start Date

1. Click ribbon **File** and click Info and enter the **Start Date** on the right side of the screen OR Click ribbon **Project** and click Project Information - this dialog box appears:



2. Enter the basic information in this dialog. There are two choices in the list **Schedule from**:
    a. Project Start Date: (forward scheduling)
    b. Project Finish Date: (backward scheduling)

Setting the Options

Date Order Options

The date order (ddmmyy or mmddyy) cannot be set inside Project 2010. You have to set it in the Windows Control Panel. This means that it will affect the date order in all your Windows applications.

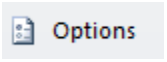
1. In Windows 7, click the start menu  , **Control Panel**, **Clock Language and Region**, **Region and Language**.
2. Click the tab **Formats** and select the date order from the list **Short Date**.
3. Click **OK** – all lists in Project 2010 that provide choices for date formats will now only show items in the date order you chose in the Control Panel.

Schedule Options in the Backstage

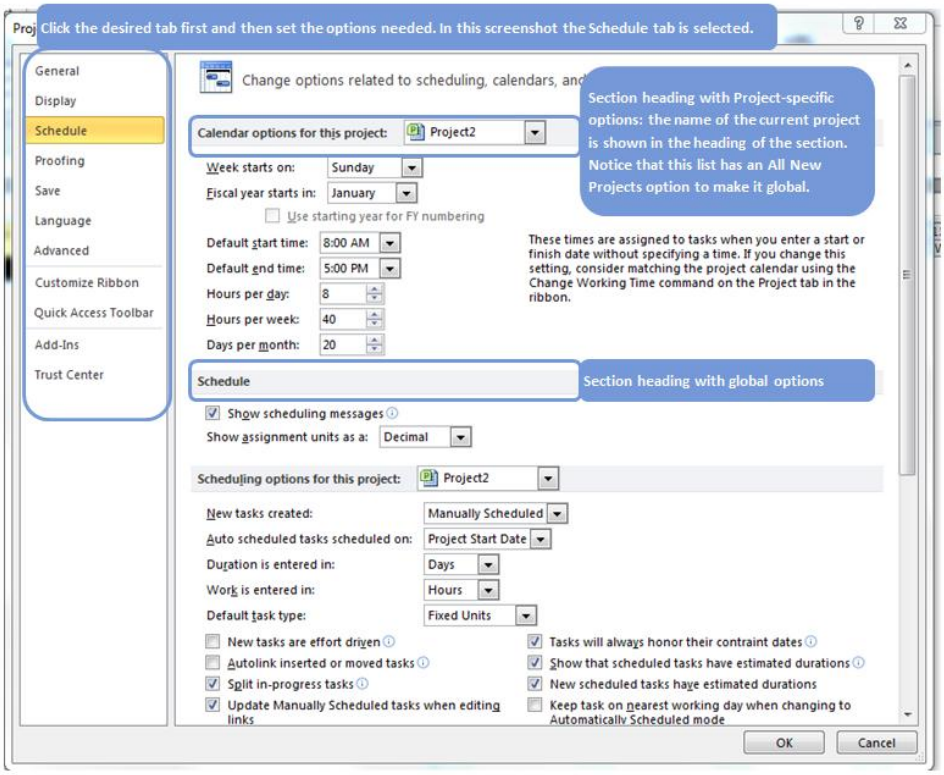
There are two types of options

1. *Global options* that take effect in **All New Projects**: these options are stored in the Windows Registry.
2. *Project-specific options* that affect the active project only: you can recognize these because they start with a section heading showing the name of the project schedule. These options are stored in the project file.

To access the options:

1. Click ribbon **File** and click 

- the **Options** dialog appears:



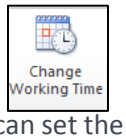
2. Select the category of options by clicking on the tabs.
3. Select the section heading and decide if the options you want to set are project-specific or global.
4. Set the options.
5. Click OK to accept the changes and close the dialog.

Setting the Project Calendar

The **Change Working Time** dialog (**Project** ribbon) allows you to set the project calendar. The default project calendar is called *Standard (Project Calendar)*. On the project calendar you indicate:

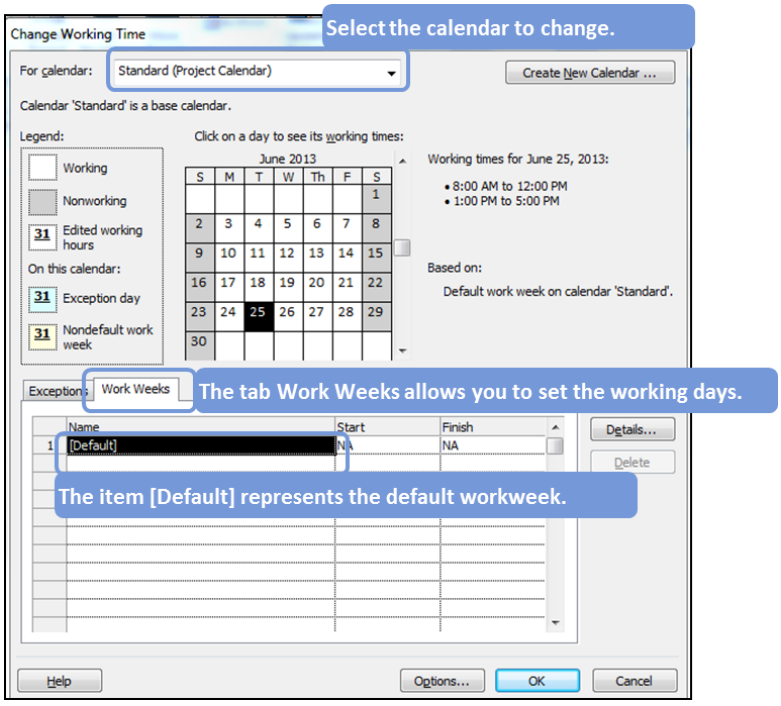
- *Workweek*
  - The *Working days* (business days) and nonworking days.
  - The *Working times* on the business days.
- National and corporate *holidays* are called *Exceptions* in MS Project.

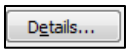
To create a calendar:

1. Click the ribbon **Project** and find the section **Properties**.
2. Click 

- **Change Working Time** dialog appears.
3. You can set the working days of the *workweek*. Select at the top of the dialog in the list **For** the item **Standard (Project Calendar)**; this is the calendar that acts as the default project calendar.

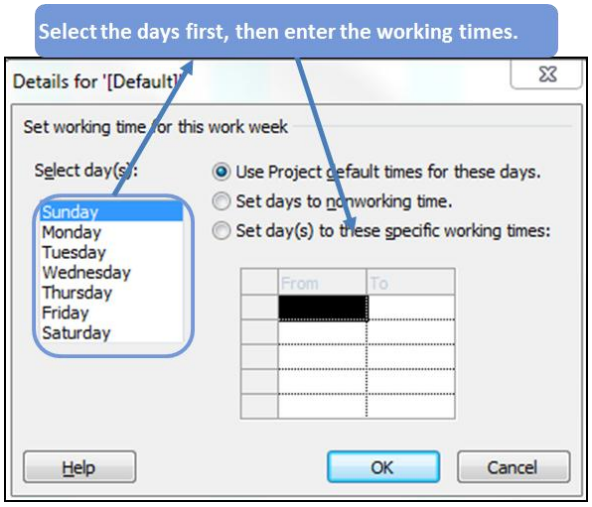
4. Click the tab **Work Weeks** – the dialog looks like:



5. The item **[Default]** is the default workweek and you could add items in this list to create multiple workweeks: For example, you may want to schedule different working hours for summer and winter. To change the default workweek, double-click the line item **[Default]** or select the item **[Default]** and click 

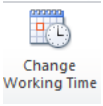
.

6. The **Details for [Default]** dialog appears.



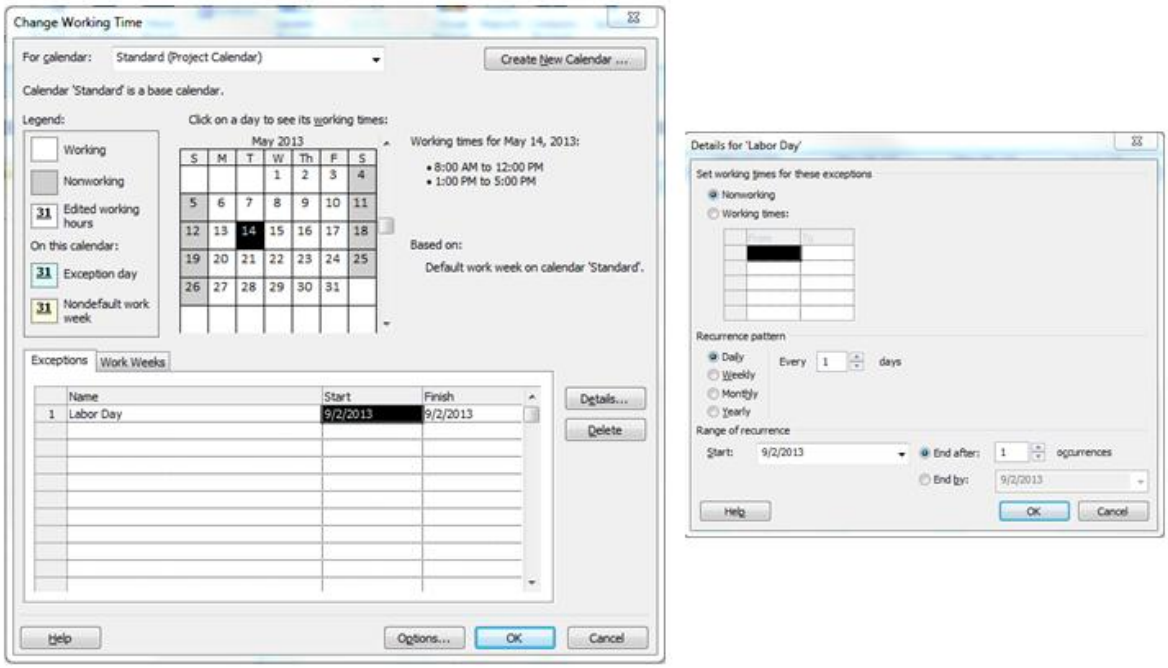
7. Select the working days of the week by dragging over the weekdays in the list **Select day(s)**.
8. Select the option **Set day(s) to these specific working times** if you need to change the default working times. You then enter the times in the grid.
9. Select the weekend days in the list **Select day(s)** and select the option **Set days to nonworking time**.
10. Click **OK** when done.

To create *Exceptions* (holidays) in a calendar:

1. Click the ribbon **Project** and find the section **Properties**.
2. Click 

- **Change Working Time** dialog appears.
3. You can set the working days of the *workweek*. Select at the top of the dialog in the list **For** the item **Standard (Project Calendar)**; this is the calendar that acts as the default project calendar.

4. Click the tab **Exceptions** – the dialog looks like:



5. Holidays need to be entered as exceptions to the default calendar.

6. In the first available field under **Name** enter the name of the holiday (exception), for example *Labor Day*.

7. Click the **Details** button, the **Details dialog** should appear as the example above.

8. Holidays (exceptions) set in the project calendar are carried over to the individual resource calendars. Even if the project calendar is changed after the resource calendars are created, the changes will show up automatically in the resource calendars.

Exercise 2.2: Setting Up a New Schedule

The goal of this exercise is to be able to create a new project and enter project-level information.

You are put in charge of relocating your office. You have to find a new location and organize the move. The following is the scope statement for the project. Your CEO has already signed the scope statement.

Scope Statement

Project: Relocation of DEVOM, Inc. to a new 150-person location
Project accounting code: MOVE001

The Business Need

DEVOM, Inc. is growing and needs larger facilities to accommodate the expanding workforce.

The Project Objectives

- To be moved and operational in the new location by November 1, 2013
- To stay within the available budget of $100,000 for labor cost
- To have 80% satisfaction rate from the personnel for the new work environment

The Project Deliverables and Requirements

- A project plan (including WBS, Network Diagram, Gantt Chart, budget, resource list, and assignments)
- A new rented or leased location that has a maximum capacity of 150 work spaces
    - The location should be accessible to disabled people
    - The location should have parking facilities for at least 150 cars
    - The location should have modern work cubicles and an open workspace
- Contracts with the landlord, the general contractor and the moving company
- The physical move of people and equipment

The Project Constraints

- The work on the project is to be started no earlier than August 1, 2012
- The personnel have to be asked for input as to the location and facilities needed
- The disruption to the normal operations of DEVOM should be minimized and may not exceed the loss of 500 person days caused by the project, including the packing and unpacking by staff
- Clients will have to be able to contact DEVOM at any time by phone, fax and email
- The purchase of new materials and equipment shall be budgeted and approved separately

- The new location will be within the boundaries of the city and its suburbs
- The need for expansion is so urgent that the project has priority over normal operations
- Any changes to the project objectives will require the approval of the CEO

Project Assumptions

- The market will continue to grow at the same rate
- The current furniture can be reused
- The current workstations can be reused
- The current LAN and servers will be replaced

Date: _____

Your Signature: Signature CEO:

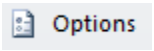
_____ I. M. DeBoss

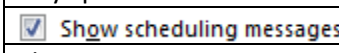
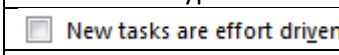
Project Manager, Relocation Project CEO, DEVOM, Inc.

You decide to take charge of this project and to create the schedule in Project 2010:

1. At the bottom of the scope statement, fill in the date and sign the charter
2. Create a new MS Project file.
3. Click ribbon **Project**, button **Project Information**. In the **Project Information** dialog:
    a. Set the start date for the project to *August 1, 2012*
    b. Make sure the **Calendar** is set to **Standard**
4. Display the ribbon **File**, tab **Info**, list button **Project Information**, item **Advanced Properties** dialog, **Summary** tab.
    a. Enter the **Title** of the project; it is *Relocation Devom, Inc.*
    b. You are the responsible project manager; enter your name under **Manager**.
    c. Enter *Devom, Inc.* under **Company**.
    d. Formulate one sentence that captures the essence of the relocation project and enter it in the field **Comments**.
5. Close the dialog and save the file as *Relocation.mpp*.

Relocation Project – File, Options

Continue to work in the file *Relocation.mpp* and enter only the following options in the ribbon **File**,  Dialog. Save the schedule when done.

Tab	Set to
Schedule	Hours per day : 7.5 (enter by typing)
	Hours per week: 37.5
	Days per month: 20
	
	Show assignment units as a : Decimal
	Duration is entered in: Days
	Work is entered in: Days
	Default Task type: Fixed Duration
	
	Calculate project after each edit: 
General	Date format: Jan 28 '09

Relocation Project – The Project Calendar

1. Display the following dialog: click ribbon **Project** and button **Change Working Time**. Set the working hours on the **Standard (Project Calendar)** to:
   8:00 to *12:00* and
   13:00 to *16:30*
2. Enter the following national holidays for the months August, September and October in the **Standard (Project Calendar)**. Since this project takes place in the USA, enter the following national holidays of the United States for 2013 into the project calendar. Make sure you select the dates below and then:
   a. *Labor Day, September 3, 2012*
   b. *Columbus Day, October 8, 2012*
   c. *Veterans Day, November 12, 2012*
3. Save your file.

Compare your file with the solution file *Exercise 2a.mpp*.

Lesson 2 Checklist: Best Practices for Project Setup

- Does the schedule contain a succinct description of the objectives or final product of the project?
  Use the field **Comments** (ribbon **File**, tab **Info**, button **Project Information** on the right side of the screen, **Advanced Properties, Summary** tab) which makes it a visible note on the project summary task.

- Do the business days, the working hours and holidays on the project calendar align with a typical, full-time resource on the project?

- Do the working hours on the **Standard (Project Calendar)** (ribbon **Project,** button **Change Working Time**) correspond to the **Hours per day** option (ribbon **File, Options,** tab **Schedule**)?

Notes

LESSON 3: ENTERING THE WORK BREAKDOWN STRUCTURE (WBS)

Topic 1: The WBS Defined

Topic 2: Task Categories

Topic 3: Entering Tasks

Topic 4: Indenting and Outdenting Tasks

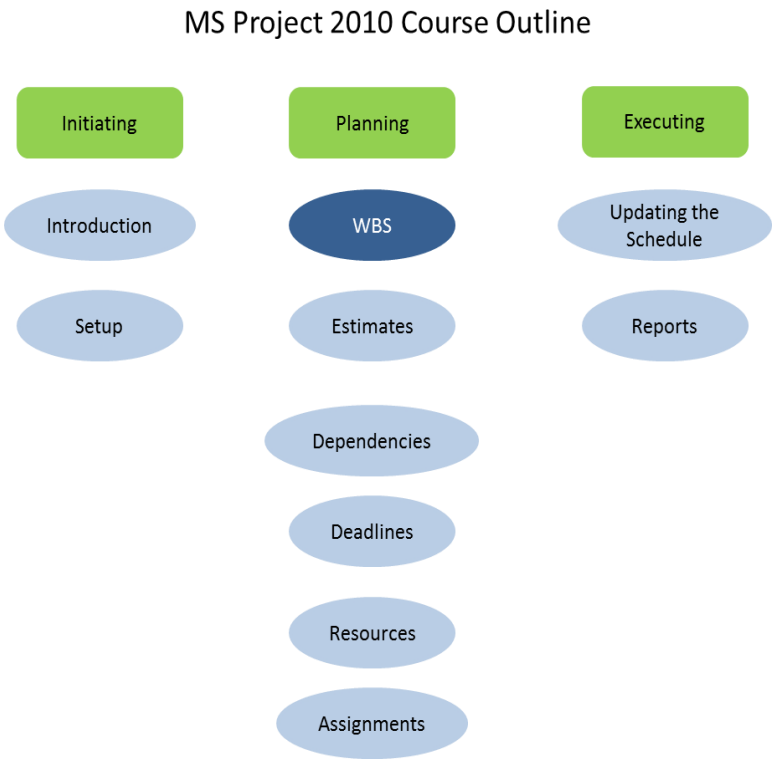
Topic 5: Changing the WBS

Student Learning Objectives

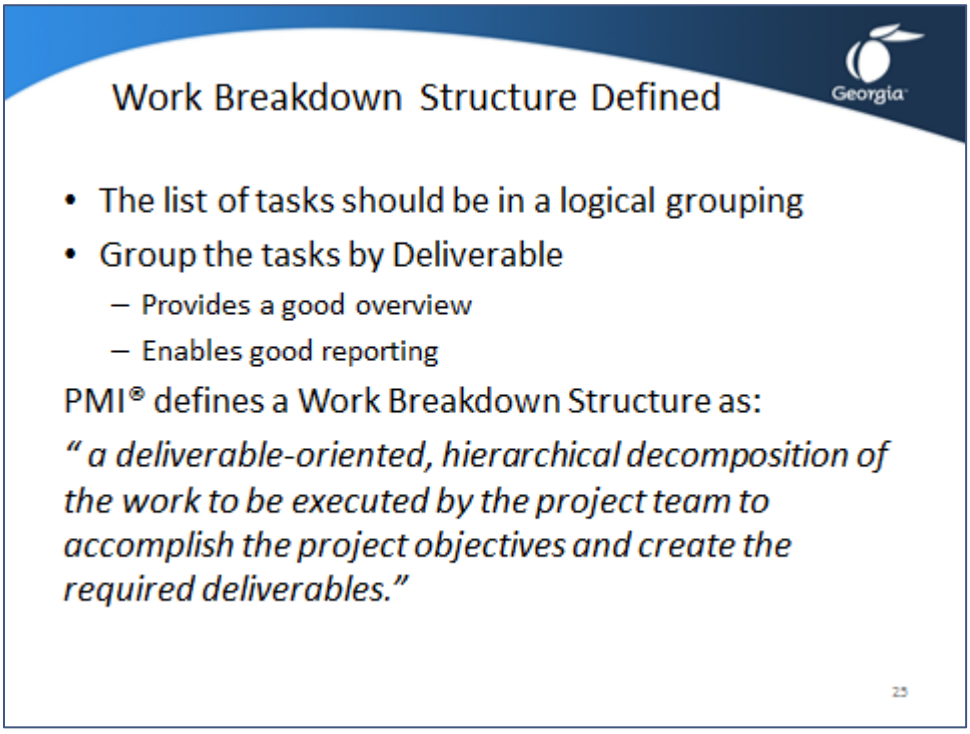
After completing this lesson you should be able to

- Understand what a Work Breakdown Structure is
- Understand how to enter and modify the WBS in MS Project
- Understand how to create summary tasks, detail tasks, milestones, and recurring tasks
- Understand how to edit, copy, and move summary and detail tasks

Approximate Presentation time: 1 hour 30 minutes



Topic 1: The WBS Defined



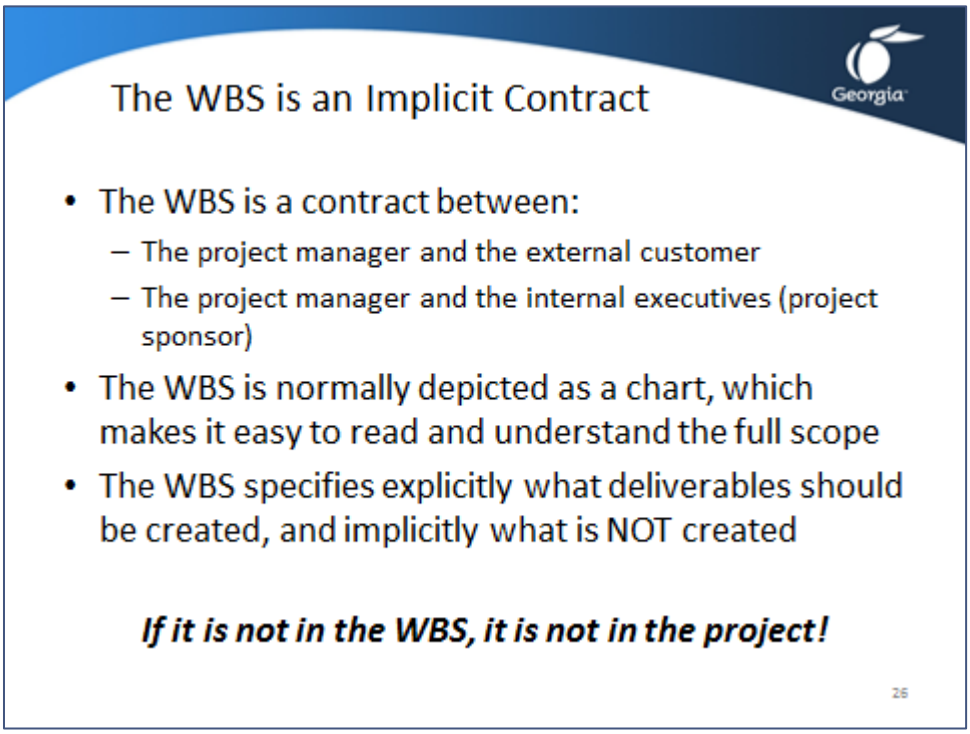
The *PMBOK® Guide* defines the Work Breakdown structure as *a deliverable-oriented, hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables.*

The WBS is the most important component of the schedule and becomes the foundation of the schedule. As in the construction of a building, if the foundation is weak, the building (schedule) will be weak; if the foundation is strong, the building (schedule) will be strong.

If the WBS is deliverables-oriented the rest of the schedule can be created more easily. For example;

- Estimating is easier for tasks that create a well-defined deliverable
- Dependencies are easier to find between deliverables
- Deadlines and constraints are often agreed upon by deliverable
- Resources are often made responsible for distinct deliverables
- An optimal schedule can be more easily found. Features (deliverables) that are expensive and may need to be postponed
- Large schedules can be kept up-to-date more easily by deliverable

Topic 1: The WBS Defined – An Implicit Contract

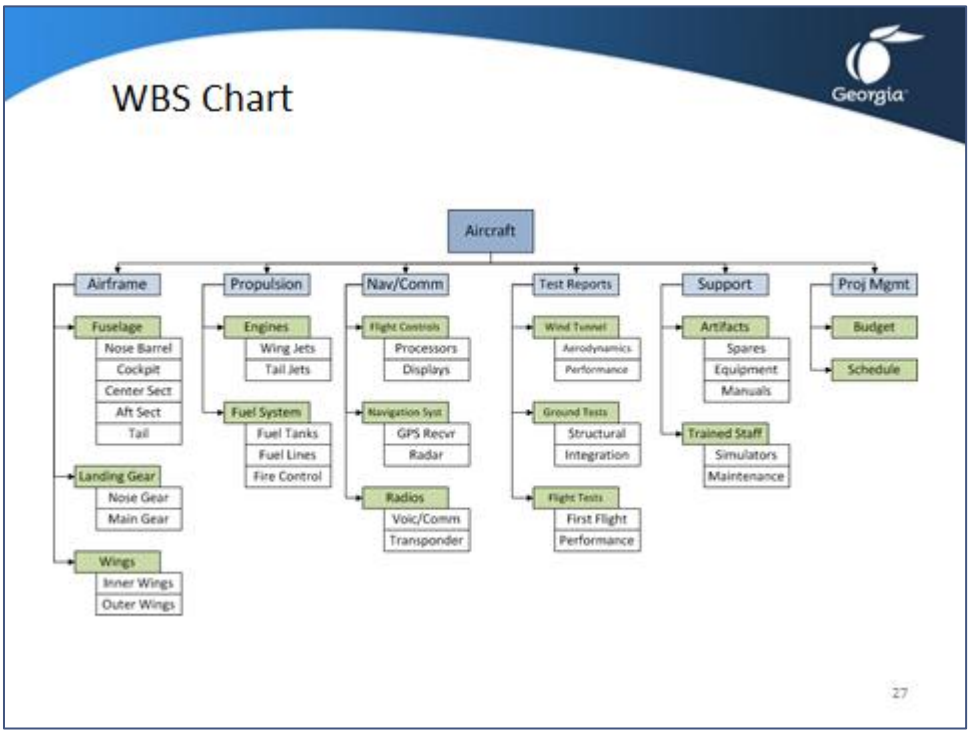


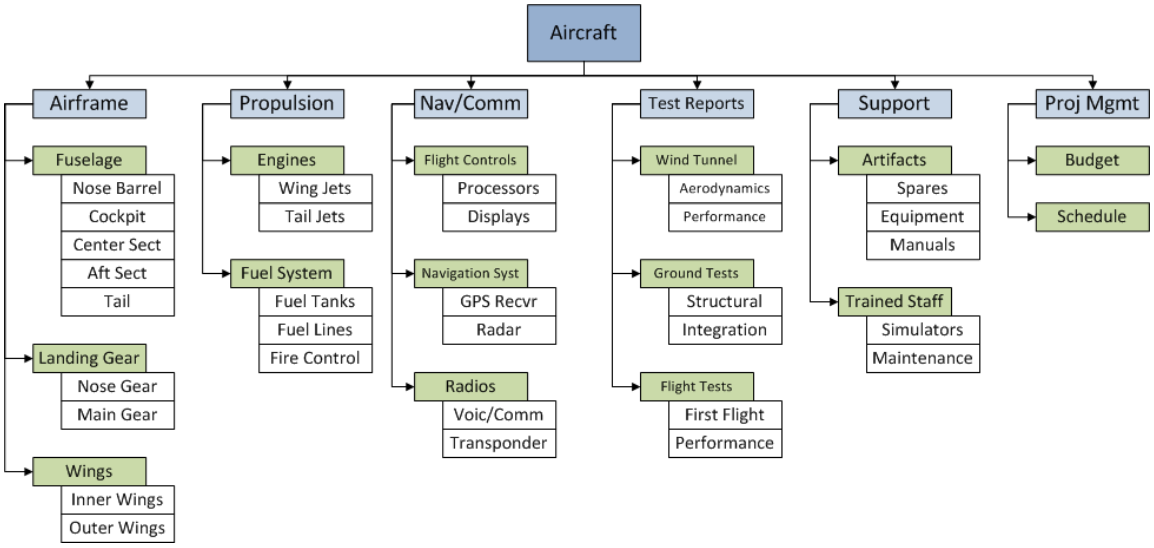
The WBS specifies explicitly what deliverables should be created. If a client requests output during project execution, the WBS should explicitly contain the output to be delivered. The 100% rule states: **the WBS should cover 100% of the work of the scope of the project and include all interim and final deliverables to be completed, including project management deliverables.**

> **Interim Deliverable** – items handed over to internal or external clients during project execution.
>
> **Final Deliverables** – items handed over to external clients at the end of the project.

The WBS also indicates implicitly what should NOT be done, since it will not be shown in the WBS. If an item is not in the WBS, it is *out-of-scope* and therefore not agreed upon with the client.

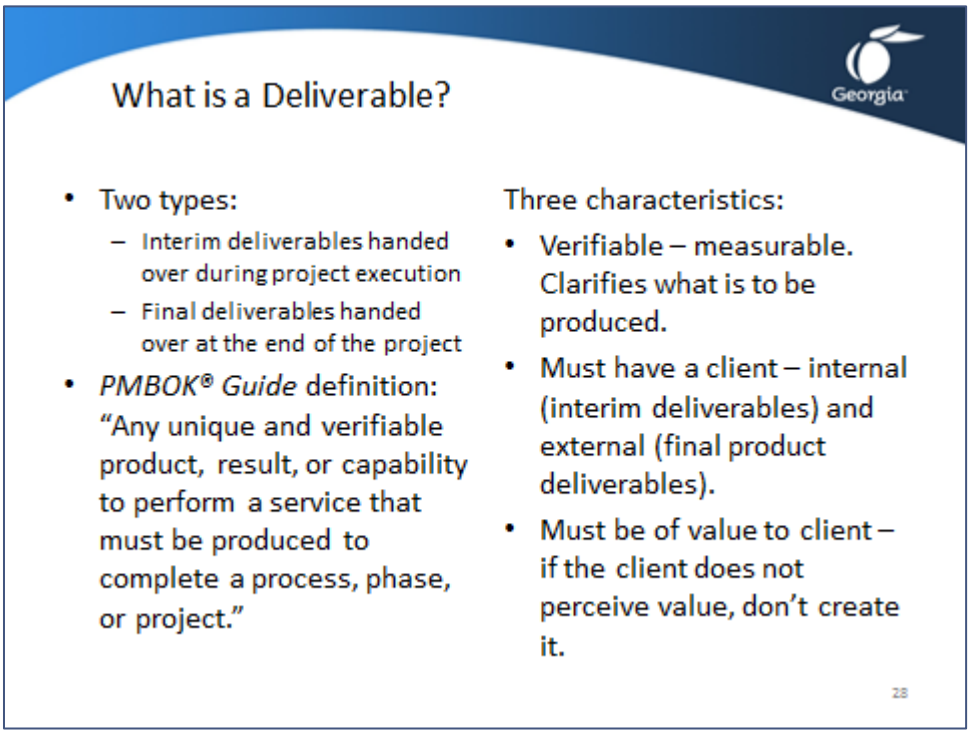
Topic 1: The WBS Defined – The Chart





MS Project does not have a WBS Chart view, but an add-in tool such as *WBS Chart Pro* will allow you to lay out the WBS in such a graphic format. You can find this tool at www.CriticalTools.com .

Topic 1: The WBS Defined – Deliverables

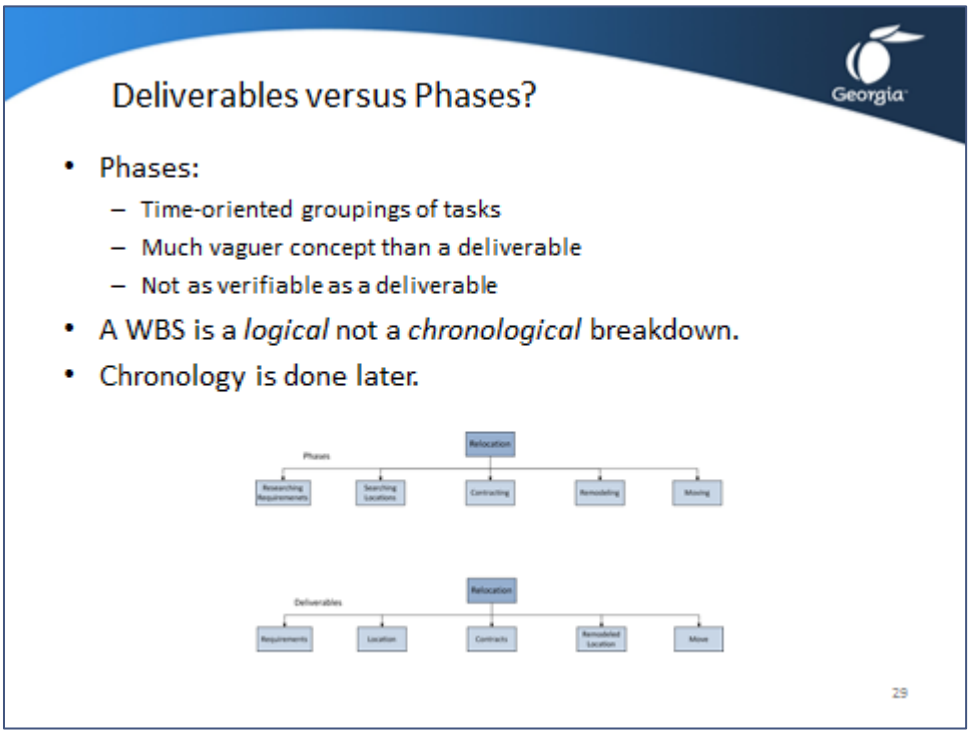


You may not be used to thinking in terms of deliverables, and sometimes it is difficult to identify the deliverables in a project. However, if you put some effort into finding the deliverables, you will be surprised how easy it is once you begin. For example, consider the office relocation project and ask yourself:

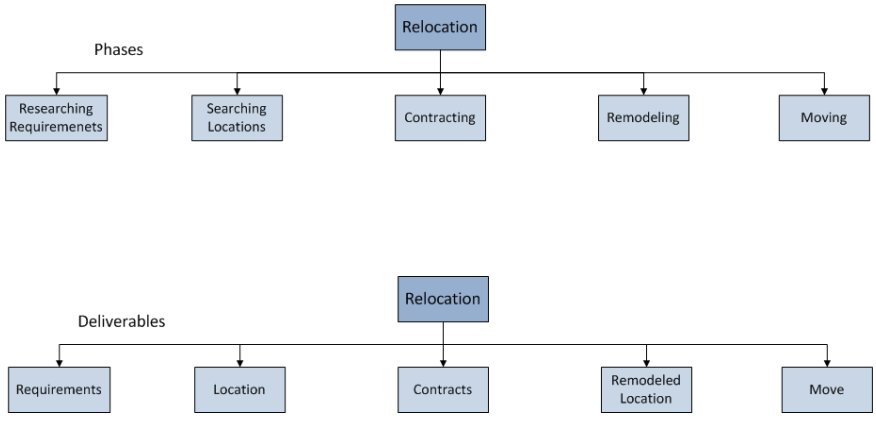
1. What are the deliverables in this project? or better yet,
2. What will my customer or sponsor expect to receive?

Ambiguously formulated deliverable	Verifiable, measurable deliverable
Closing	Customer approval of the project product
Subcontracting	Signed contract
Moving to new location	Operational new location
Renovation	Renovated facility
Planning	Approved project plan
Material procurement	Procured construction materials
Prototype development	Developed prototype
Training	300 trained application users
Staff	50 newly hired staff members
implementation	New workstations operational for entire team

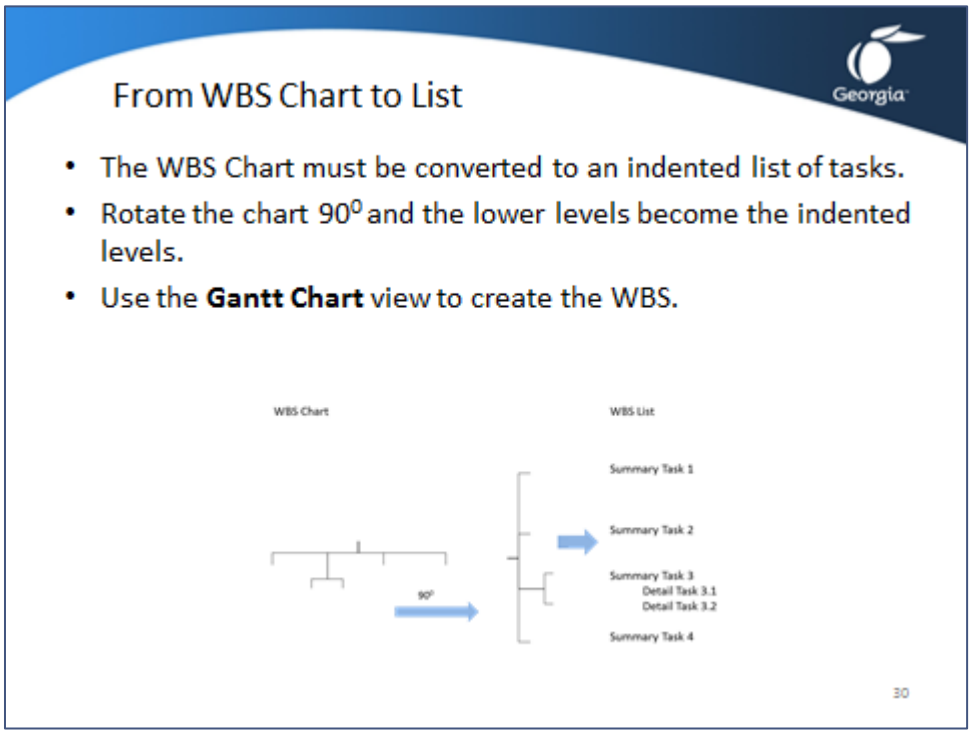
Topic 1: The WBS Defined – Deliverables versus Phases

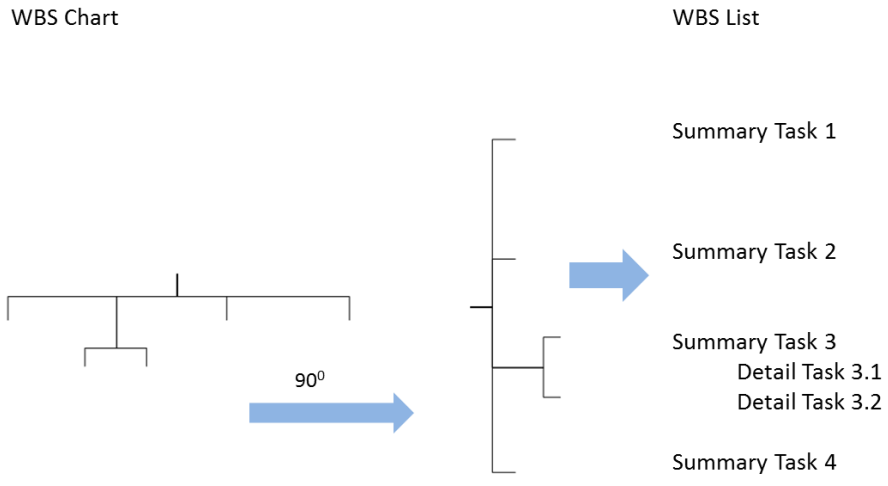


When people have difficulty identifying deliverables, they often group the tasks into *phases*. Phases are distinct periods in the life of a project, merely time-oriented groupings of tasks. Phases become chronological groupings of tasks creating a *chronological breakdown* of the work. This does not provide verifiability of the deliverables. Another reason to stay away from chronological breakdowns is the number of iterative processes in project management. A chronological orientation will tie your brain in knots when dealing with iterative processes. In a deliverable-oriented breakdown you simply add one (interim) deliverable for an iteration.

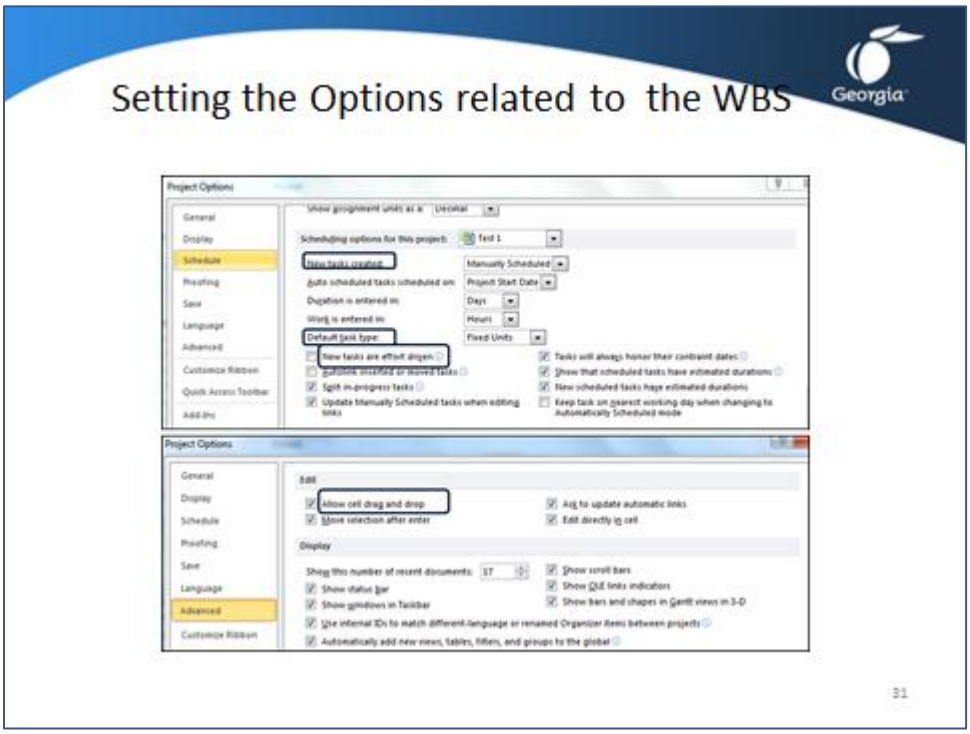


Topic 1: The WBS Defined – From WBS Chart to WBS List





Topic 1: The WBS Defined – Setting the Options related to the WBS

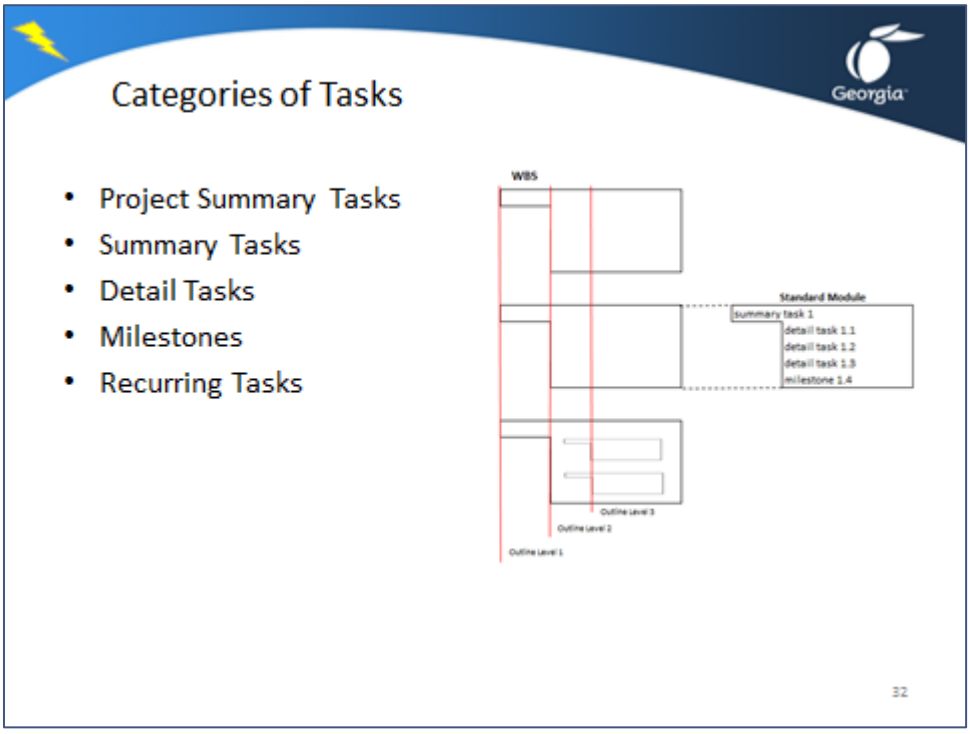


To set the options related to the WBS and tasks, click ribbon File, Options and click on the tab of the dialog box indicated in the table below.

Tab	Option
Schedule	Section **Scheduling options for this project:** **New tasks created: Manually Scheduled** or **Auto Scheduled**; (we will discuss Manually Scheduled and Auto Scheduled tasks in the next section). Use **Manually Scheduled** if you create a draft or high-level schedule. If you create a detailed schedule use **Auto Scheduled**. **Default task type** Many people enter the duration immediately. If you do this we recommend setting this option to **Fixed Duration**. If you normally enter **Work** estimates, we recommend **Fixed Work** as the default task type. In this way you protect the estimates you enter. It is the default task type for new tasks you create. On a task-by-task basis you can still decide what type serves you best and switch the task **Type** to it. **New tasks are effort driven** (un-checked) This option changes the number of resources assigned (assignment units); we recommend you turn it off for **Fixed Duration** and **Fixed Units** tasks. It functions like **Fixed Work** tasks and we recommend you use the task type instead. **Fixed Work** tasks are by definition effort-driven and have this option always on.

Advanced	Section **Edit**: **Allow cell drag and drop** (checked) This allows you to move or copy the selected cells by dragging the selected area by its border. With this option on, you can quickly rearrange your WBS by dragging tasks. This option is global across all your schedules.

Topic 2: Task Categories



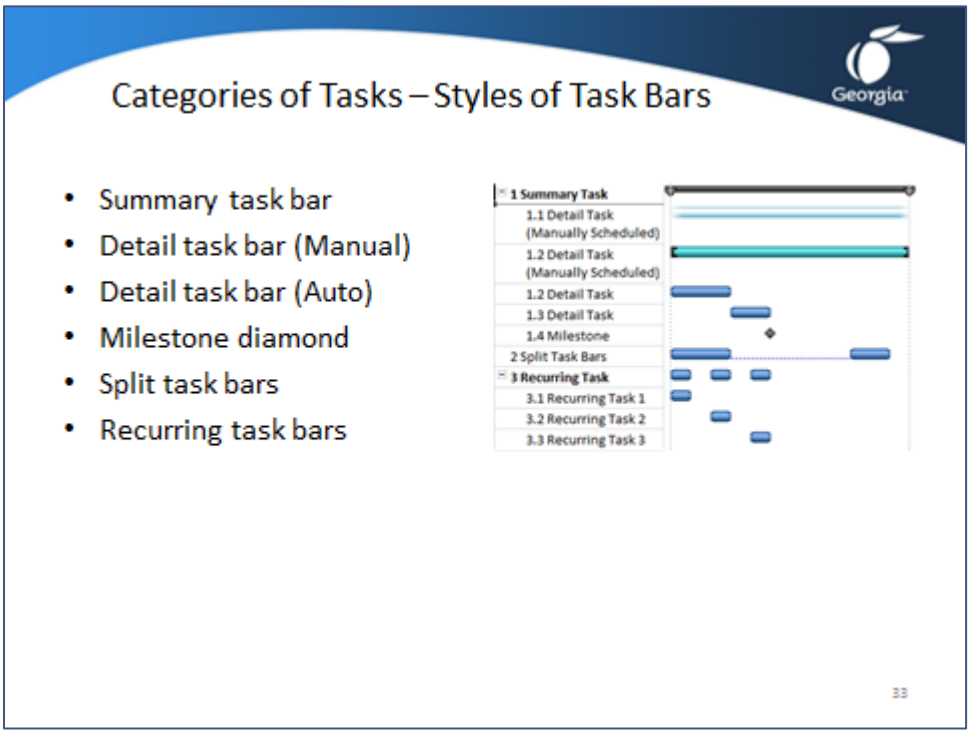
If you analyze an indented list of tasks, you will find that a standard building block or module recurs. The module consists of a summary task (the deliverable) with its detail tasks and a milestone indented. The summary task summarizes the cost, work, and duration of all its sub-tasks. These standard modules can even be nested inside one another, thus creating the next indentation level.

Build your WBS in a modular way and use the following standard module of tasks. Your WBS will consist of several of these standard modules.

Standard Module	**Example**
Summary task 1 Detail task 1.1 Detail task 1.2 Detail task 1.3 Milestone 1.4	1. Report 1.1 Gather data 1.2 Categorize data 1.3 Write report 1.4 Report ready

Milestones should be indented on the same level as the detail tasks.

Topic 2: Task Categories – Styles of Task Bars



Additional remarks:

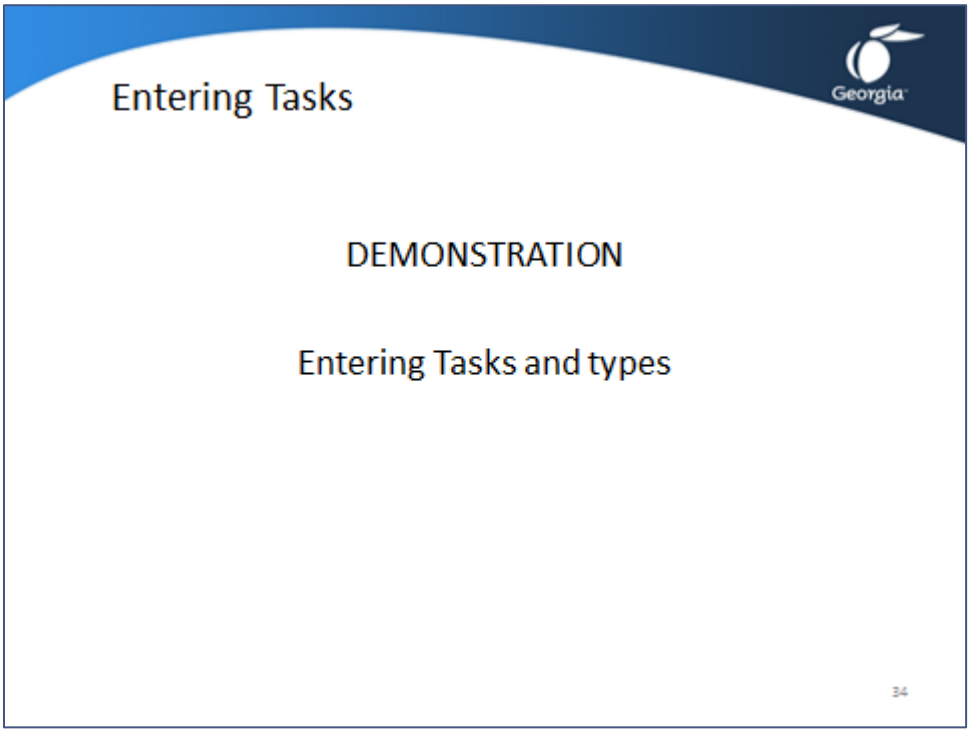
- *Summary task bar*
  It indicates a tasks start and end point. For **Auto Scheduled** tasks the bar starts when its first detail task starts, and ends when its last detail task (or milestone) ends.
- *Detail task bar*
  Manually scheduled task bars have either washed out ends or square brackets to indicate the end date. An **Auto Scheduled** detail task bar is shown as a simple bar with rounded ends. The length of the bar represents its estimated duration.
- *Milestone diamond*
  Auto Scheduled milestones appear as black diamonds. **Manually Scheduled** milestones are gray (without dates or *unscheduled*) or blue when they have dates (*scheduled*). Milestones have zero duration.
- *Split task bar*
  A split task bar has multiple parts connected by dots. This indicates that the scheduled work is to be interrupted and resumed at a later date. These types of tasks should be used during project execution only.
- *Recurring task bar*
  Recurring task bars have multiple parts that occur at a regular interval. Recurring tasks are useful to model things you do regularly such as meetings, reviews, etc. They act as summary tasks with detail tasks indented underneath them.

Formulating WBS Elements:

It is important to pay attention to the wording you use to create the elements of the WBS. The following formats are recommended.

- *Summary task*
  Summary tasks can be deliverables or phases:
  - Deliverables: Use ***nouns*** for deliverables, for example *location* or *design*. Nouns are words you can put the word "the" in front of. You can also add an adjective to describe the noun and improve its measurability. An example is, *signed contract* rather than *contract* or the *final design* rather than *design*.
  - Phases: Use ***verbs*** in the *present continuous* tense (-ing) for phases. This tense best indicates that something is ongoing for a period of time. Example: *Researching* or *Remodeling*.
- *Detail tasks*
  Use ***verbs*** in the *present* tense for detailed tasks. This indicates action. Examples include *discuss with publisher, code universal logon feature,* or *purchase equipment*.
- *Milestones*
  Typically the milestone is expressed as follows:
  <deliverable> <past perfect tense verb>
  Where *<deliverable>* is a noun that describes the deliverable, and the *<past perfect tense verb>* describes what is supposed to happen to the deliverable at that point in time. For example: *delivered, accepted, completed, done, sent, shipped,* and *finished.* Example of a milestone: *module completed, server installed, printer delivered,* or *report accepted.*
- *Recurring tasks*
  Recurring tasks will become summary tasks in MS Project. Use plural ***nouns*** when they reflect recurring deliverables, for example *schedule updates, change request reviews,* and *status reports*. You could also use present tense ***verbs*** for recurring activities, for example *review change requests, meet with team,* or *meet with steering committee*.

Topic 3: Entering Tasks



We will discuss how to enter the different elements of a *WBS* into the Gantt Chart view on the pages that follow.

- Detail tasks
- Summary tasks
- Split tasks
- Recurring tasks
- Milestones

Project 2010 will automatically wrap the task name and increase the row height when the task name you enter or paste exceeds the width of the **Task Name** field; if you increase the column width it will decrease the row height again.

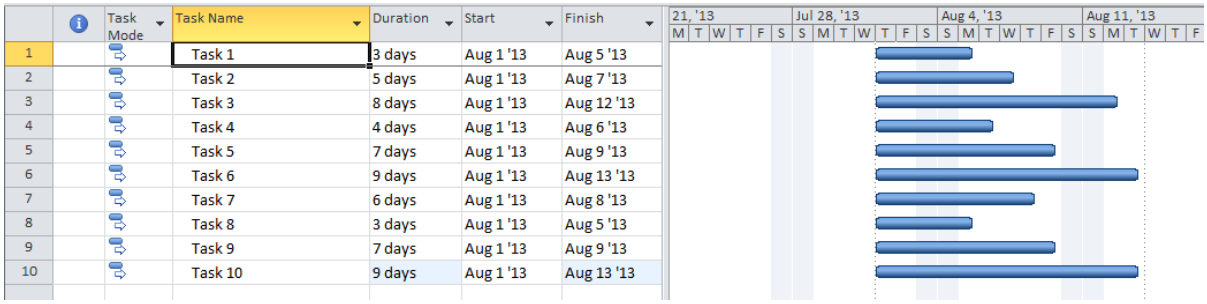
Use the demonstration project file **Demo Lesson 3 Entering Tasks**.

Exercise 3.1: Entering Tasks

Instructions:
Open the MPP file *Exercise 3*. Follow the instructions below.

Entering Detail Tasks

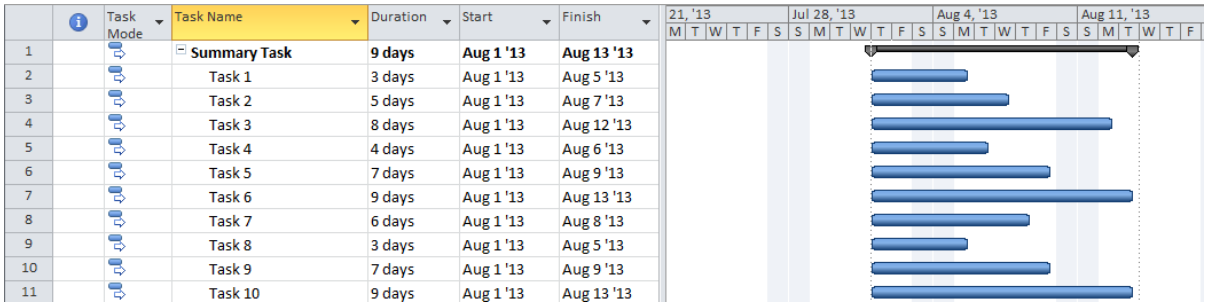
1. Set **New Tasks: Auto Scheduled** by clicking on the left side of the status bar at the bottom of the page and selecting the option.
2. Enter 10 tasks (name them **Task 1** to **Task 10**) each in a separate line.
3. Enter the duration for each task in the column Duration as per the screenshot below (Task 1 – 3 days, Task 2 – 5 days, Task 3 – 8 days, Task 4 – 4 days, Task 5 – 7 days, Task 6 – 9 days, Task 7 – 6 days, Task 8 – 3 days, Task 9 – 7 days, Task 10 – 9 days).



	Task Mode	Task Name	Duration	Start	Finish
1		Task 1	3 days	Aug 1 '13	Aug 5 '13
2		Task 2	5 days	Aug 1 '13	Aug 7 '13
3		Task 3	8 days	Aug 1 '13	Aug 12 '13
4		Task 4	4 days	Aug 1 '13	Aug 6 '13
5		Task 5	7 days	Aug 1 '13	Aug 9 '13
6		Task 6	9 days	Aug 1 '13	Aug 13 '13
7		Task 7	6 days	Aug 1 '13	Aug 8 '13
8		Task 8	3 days	Aug 1 '13	Aug 5 '13
9		Task 9	7 days	Aug 1 '13	Aug 9 '13
10		Task 10	9 days	Aug 1 '13	Aug 13 '13

Entering Summary Tasks

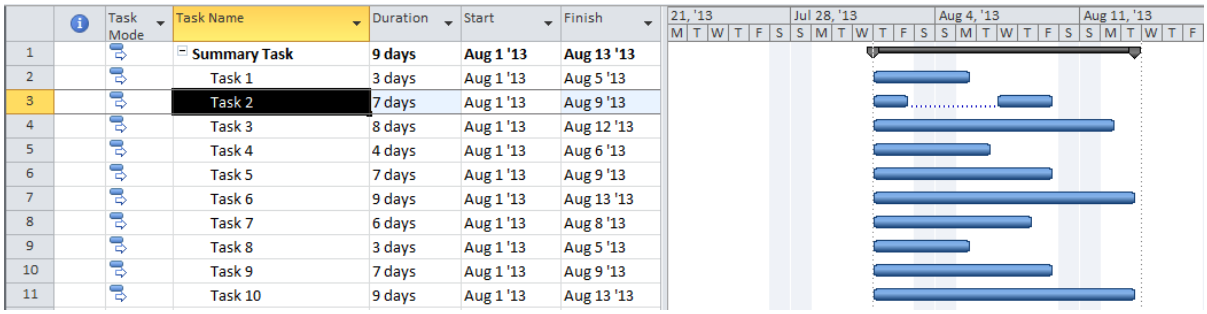
1. Highlight the 10 tasks and click on **Insert Summary Task** in the **Task** ribbon **Insert** group. Enter a name for the summary task.
2. On the **File** tab, select save.



	Task Mode	Task Name	Duration	Start	Finish
1		**Summary Task**	**9 days**	**Aug 1 '13**	**Aug 13 '13**
2		Task 1	3 days	Aug 1 '13	Aug 5 '13
3		Task 2	5 days	Aug 1 '13	Aug 7 '13
4		Task 3	8 days	Aug 1 '13	Aug 12 '13
5		Task 4	4 days	Aug 1 '13	Aug 6 '13
6		Task 5	7 days	Aug 1 '13	Aug 9 '13
7		Task 6	9 days	Aug 1 '13	Aug 13 '13
8		Task 7	6 days	Aug 1 '13	Aug 8 '13
9		Task 8	3 days	Aug 1 '13	Aug 5 '13
10		Task 9	7 days	Aug 1 '13	Aug 9 '13
11		Task 10	9 days	Aug 1 '13	Aug 13 '13

Entering Split Tasks

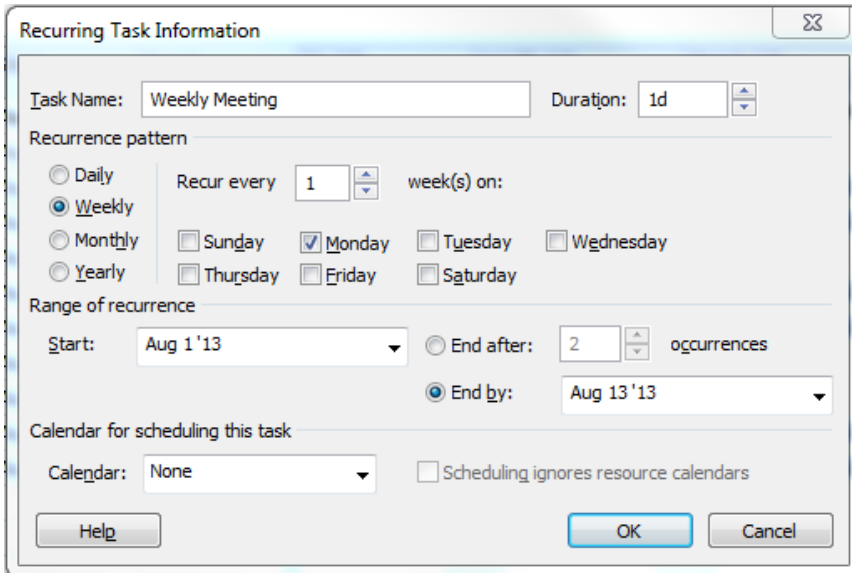
1. Highlight **Task 2**.
2. Click on the **Split** icon  on the **Task** ribbon.
3. Watch the **Split Task** box and move your mouse cursor half-way over the bar of Task 2 in the Gantt chart.
4. Left click with your mouse. The task will split and each part can be moved independently.



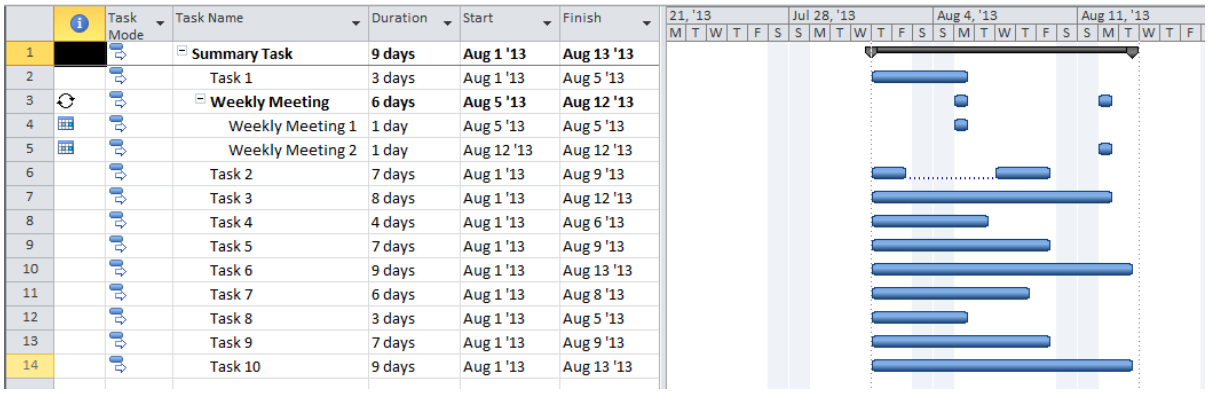
	Task Mode	Task Name	Duration	Start	Finish
1		**Summary Task**	**9 days**	**Aug 1 '13**	**Aug 13 '13**
2		Task 1	3 days	Aug 1 '13	Aug 5 '13
3		Task 2	7 days	Aug 1 '13	Aug 9 '13
4		Task 3	8 days	Aug 1 '13	Aug 12 '13
5		Task 4	4 days	Aug 1 '13	Aug 6 '13
6		Task 5	7 days	Aug 1 '13	Aug 9 '13
7		Task 6	9 days	Aug 1 '13	Aug 13 '13
8		Task 7	6 days	Aug 1 '13	Aug 8 '13
9		Task 8	3 days	Aug 1 '13	Aug 5 '13
10		Task 9	7 days	Aug 1 '13	Aug 9 '13
11		Task 10	9 days	Aug 1 '13	Aug 13 '13

Entering Recurring Tasks

1. Highlight **Task 2**.
2. In the **Insert** group on the **Task** ribbon, click on the drop-down arrow of the **Task** button, and click on **Recurring Tasks**.
3. In the **Recurring Task Information** dialog box, enter **Weekly Meeting** as the name.
4. For the **Recurrence pattern**, select **Weekly**, in the **Recur every** field, enter **1**, check **Monday**, and click **OK**.



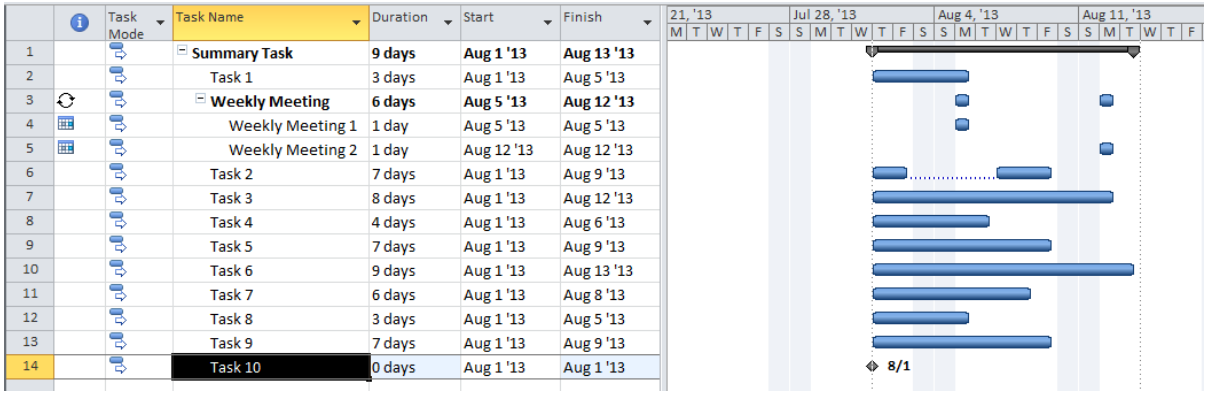
5. Click on the **+** by the name of the parent task to expand, click again to collapse.
   Note that by default the end date of the recurrence is set to the project finish date.



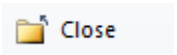
	Task Mode	Task Name	Duration	Start	Finish
1		**Summary Task**	**9 days**	**Aug 1 '13**	**Aug 13 '13**
2		Task 1	3 days	Aug 1 '13	Aug 5 '13
3		**Weekly Meeting**	**6 days**	**Aug 5 '13**	**Aug 12 '13**
4		Weekly Meeting 1	1 day	Aug 5 '13	Aug 5 '13
5		Weekly Meeting 2	1 day	Aug 12 '13	Aug 12 '13
6		Task 2	7 days	Aug 1 '13	Aug 9 '13
7		Task 3	8 days	Aug 1 '13	Aug 12 '13
8		Task 4	4 days	Aug 1 '13	Aug 6 '13
9		Task 5	7 days	Aug 1 '13	Aug 9 '13
10		Task 6	9 days	Aug 1 '13	Aug 13 '13
11		Task 7	6 days	Aug 1 '13	Aug 8 '13
12		Task 8	3 days	Aug 1 '13	Aug 5 '13
13		Task 9	7 days	Aug 1 '13	Aug 9 '13
14		Task 10	9 days	Aug 1 '13	Aug 13 '13

Creating a Milestone

1. Highlight **Task 10** and enter **0** as the duration. A task with 0 duration is a milestone.

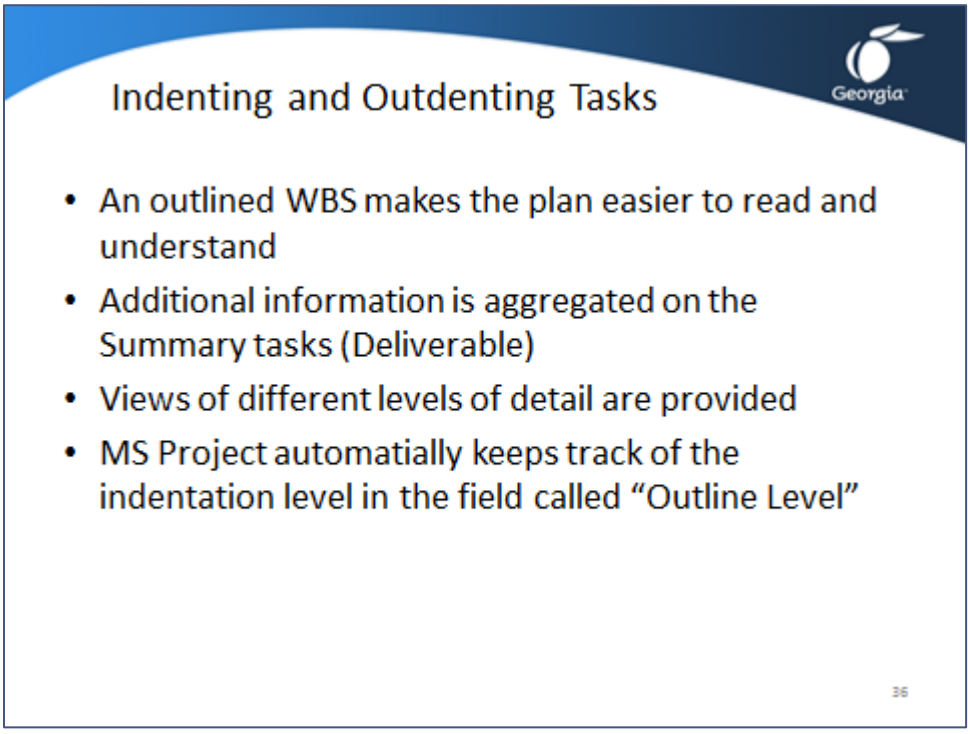


	Task Mode	Task Name	Duration	Start	Finish
1		**Summary Task**	**9 days**	**Aug 1 '13**	**Aug 13 '13**
2		Task 1	3 days	Aug 1 '13	Aug 5 '13
3		**Weekly Meeting**	**6 days**	**Aug 5 '13**	**Aug 12 '13**
4		Weekly Meeting 1	1 day	Aug 5 '13	Aug 5 '13
5		Weekly Meeting 2	1 day	Aug 12 '13	Aug 12 '13
6		Task 2	7 days	Aug 1 '13	Aug 9 '13
7		Task 3	8 days	Aug 1 '13	Aug 12 '13
8		Task 4	4 days	Aug 1 '13	Aug 6 '13
9		Task 5	7 days	Aug 1 '13	Aug 9 '13
10		Task 6	9 days	Aug 1 '13	Aug 13 '13
11		Task 7	6 days	Aug 1 '13	Aug 8 '13
12		Task 8	3 days	Aug 1 '13	Aug 5 '13
13		Task 9	7 days	Aug 1 '13	Aug 9 '13
14		Task 10	0 days	Aug 1 '13	Aug 1 '13

Close the exercise file by clicking the File tab, Close button 

. Click **Yes** on the **Microsoft Project** dialog box.

Topic 4: Indenting and Outdenting Tasks



Listed below is the process for how to indent and outdent a task.

Indenting Tasks

1. Select the detail tasks by dragging anywhere over them in the spreadsheet.
2. Click ribbon **Task**, then click the **Indent** icon in the **Schedule** group . After indenting tasks, MS Project shows a calculated duration that covers the time span of all its detail tasks.

Outdenting Tasks

1. Select the detail tasks by dragging anywhere over them in the spreadsheet.
2. Click ribbon **Task**, then click the **Outdent** icon in the **Schedule** group .

Exercise 3.2: Indenting and Outdenting Tasks

Instructions:
Open the MPP file *Exercise 3a*. Follow the instructions below.

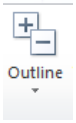
Indenting Tasks

1. Select the identified tasks by dragging anywhere over them in the spreadsheet (Task 2, Task 3, Task 4).
2. Click ribbon **Task**, then click the **Indent** icon in the **Schedule** group  . Notice the Outline level .
3. Repeat for (Task 7, Task 8, Task 9).

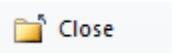
Outdenting Tasks

1. Select Task 8 and Task 9 by dragging anywhere over them in the spreadsheet.
2. Click ribbon **Task**, then click the **Outdent** icon in the **Schedule** group  .

Hide and Reveal Detail Tasks

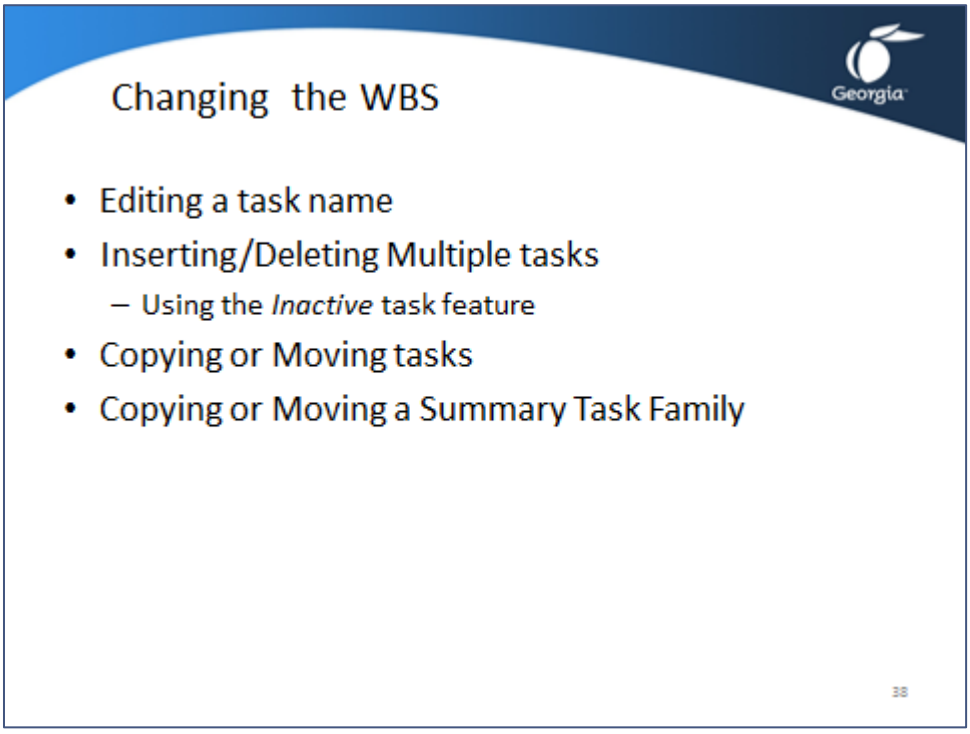
1. Click on the minus button in front of summary task **Task 1** to hide its detail tasks.
2. The detail tasks can be displayed again by clicking the plus button in front of summary task **Task 1**.
3. To hide all detail tasks, you click ribbon **View**, 

and select **Hide subtasks**. From this same drop-down menu, select **Show subtasks** to display subtasks on the next level for the selected tasks(s) only or **All Subtasks** to display all levels of the entire WBS.

Close the exercise file by clicking the **File** tab, Close button 

. Click **Yes** on the **Microsoft Project** dialog box.

Topic 5: Changing the WBS



This section will demonstrate basic task editing capabilities within MS Project.

Editing a Task Name

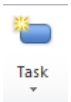
You can replace a task name by typing over it. For small editorial changes (correct a typo), it is better to edit the task name.

1. Click once in the field and, after a second, click again and a blinking cursor appears.
2. Move the cursor by clicking with the mouse or using the arrow keys.
3. Make the changes.
4. Press **Enter** to accept the changes and finish the editing.

Inserting Multiple Tasks

This section discusses how to insert more than one task into the WBS.

1. Point to the row heading before which you want to insert multiple tasks, click and drag down to highlight as many rows as you need inserted.
2. Press the Insert key and the number of rows you selected are inserted as blank rows, OR

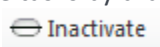
3. Click the top portion of 

and as many **<New Task>**s appear.

Deleting Multiple Tasks

MS Project has a new feature called *inactive tasks*. When you make a task inactive, it will not disappear but it will not have any effect on the rest of the schedule and its cost and workload will not be aggregated on summary tasks.

1. Select the tasks by dragging over their row headers.

2. Press the **Delete** key. OR the  button on the **Task** ribbon, **Clipboard** group.
3. To make a task inactive.
    a. Select the tasks by dragging over their row headers.
    b. Click the  button on the **Task** ribbon, **Schedule** group. Notice the Tasks have been grayed out and the strikethrough font is applied. To make the tasks active again, reselect and click on the Inactivate button again.

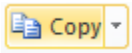
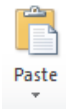
Copying or Moving Tasks

It is important to note that you must select the entire task to perform these operations. You do this by clicking either the row header or the task bar.

Copying Tasks

1. Select the tasks by dragging over their row headers by using the mouse pointer.
2. Release the mouse button when you have selected all asks to copy; they are now highlighted.
3. Point to one selected row headings and the mouse pointer changes to a star. Hold down the **Control** key, and hold down the primary mouse button. The mouse pointer will change to a small + sign. This indicates you are copying. Drag the copied tasks to their new place and release the primary mouse button. The option **Allow Cell drag and drop** needs to be selected (ribbon **File**, Options, tab **Advanced**).

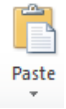
OR

4. Click ribbon **Task** and click  ; the task is now stored in the clipboard. Select the task before which you wish to insert. Click the top part of the  button on the **Task** ribbon.

Moving Tasks

1. Select the tasks by dragging over their row headers by using the mouse pointer - they are now highlighted.
2. Point to one selected row heading and the mouse pointer changes to a star. Click and hold down the primary mouse button and start dragging. The mouse pointer will change to an arrow. Drag the tasks to their new place; a horizontal gray line will indicate where the tasks will end up when you release the mouse. The option **Allow Cell drag and drop** needs to be selected (ribbon **File**, Options, tab **Advanced**).

OR

3. Click ribbon **Task** and click ; the task is now stored in the clipboard. Select the task before which you wish to insert. Click the top part of the  button on the **Task** ribbon.
4. Notice MS Project creates new rows inserting the moved tasks.

To Copy or Move a Summary Task Family

Select the summary task by clicking on its row heading. (Hold the Control key down if you want to copy instead of move.) Hold down the primary mouse button and drag the summary task; MS Project will immediately highlight all of its detail tasks. Release the summary task where you want it.

Exercise 3.3: Changing the WBS

Instructions:
Open the MPP file *Exercise 3b*. Follow the instructions below.

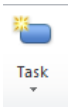
Editing a Task Name

Select **Task 1** and change the **Task Name** to "**Update Customer Report**".

1. Click once in the field and, after a second, click again and a blinking cursor appears.
2. Move the cursor by clicking with the mouse or using the arrow keys.
3. Make the changes.
4. Press **Enter** to accept the changes and finish the editing.

Inserting Multiple Tasks

This section discusses how to insert more than one task into the WBS.

1. Point to the row heading for **Task 2**, click and drag down 3 rows.
2. Press the Insert key and the 3 rows you selected are inserted as blank rows, **OR**
3. Click the top portion of 

and 3 **<New Task>**s appear.

	Task Mode	Task Name	Outline Level	Duration
1		Update Customer Report	1	1 day?
2		<New Task>	1	1 day?
3		<New Task>	1	1 day?
4		<New Task>	1	1 day?
5				
6				
7				
8		Task 2	1	1 day?
9		Task 3	1	1 day?
10		Task 4	1	1 day?
11		Task 5	1	1 day?
12		Task 6	1	1 day?

Deleting Multiple Tasks

MS Project has a new feature called *inactive tasks*. When you make a task inactive, it will not disappear but it will not have any effect on the rest of the schedule and its cost and workload will not be aggregated on summary tasks.

1. Select the newly created tasks with blank Task Names by dragging over their row headers.
2. Press the **Delete** key. OR the Cut button on the **Task** ribbon, **Clipboard** group.
3. The tasks will be deleted.
4. Select the **<New Tasks>** tasks by dragging over their row headers.
5. Click the Inactivate button on the **Task** ribbon, **Schedule** group. Notice the Tasks have been grayed out and the strikethrough font is applied.

	Task Mode	Task Name	Outline Level	Duration
1		Update Customer Report	1	1 day?
2		~~<New Task>~~	~~1~~	~~1 day?~~
3		~~<New Task>~~	~~1~~	~~1 day?~~
4		~~<New Task>~~	~~1~~	~~1 day?~~
5		Task 2	1	1 day?
6		Task 3	1	1 day?
7		Task 4	1	1 day?
8		Task 5	1	1 day?
9		Task 6	1	1 day?

Copying or Moving Tasks

It is important to note that you must select the entire task to perform these operations. You do this by clicking either the row header or the task bar. The option **Allow Cell drag and drop** needs to be selected (ribbon **File**, Options, tab **Advanced**) for both of these activities.

Copying Tasks

1. Select (**Task 2, Task 3,** and **Task 4**) by dragging over their row headers with the mouse pointer.
2. Release the mouse button when you have selected all 3 tasks to copy. They are now highlighted.
3. Point to one selected row heading and the mouse pointer changes to a star. Click and hold down the primary mouse button. The mouse pointer will change to an arrow. Drag the tasks to **Task 7**; a horizontal gray line will indicate where the tasks will end up when you release the mouse. **OR**
4. Click ribbon **Task** and click Copy ; the tasks are now stored in the clipboard. Select the row header

   for **Task 7** to insert. Click the top part of the Paste button on the **Task** ribbon.

Tasks 2, 3, an 4 should now follow Task 6

	Task Mode	Task Name	Outline Level	Duration
1		Update Customer Report	1	1 day?
2		~~<New Task>~~	~~1~~	~~1 day?~~
3		~~<New Task>~~	~~1~~	~~1 day?~~
4		~~<New Task>~~	~~1~~	~~1 day?~~
5		Task 2	1	1 day?
6		Task 3	1	1 day?
7		Task 4	1	1 day?
8		Task 5	1	1 day?
9		Task 6	1	1 day?
10		Task 2	1	1 day?
11		Task 3	1	1 day?
12		Task 4	1	1 day?

Moving Tasks

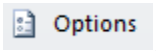
1. Select **Tasks 2, 3, and 4** by dragging over their row headers by using the mouse pointer.
2. Click ribbon **Task** and click Cut ; the task is now stored in the clipboard. Select the row header for **Task 7**. Click the top part of the Paste button on the **Task** ribbon.
3. Notice MS Project creates new rows inserting **Tasks 2, 3, and 4** after **Task 6**.

	Task Mode	Task Name	Outline Level	Duration
1		Update Customer Report	1	1 day?
2		<New Task>	1	1 day?
3		<New Task>	1	1 day?
4		<New Task>	1	1 day?
5		Task 5	1	1 day?
6		Task 6	1	1 day?
7		Task 2	1	1 day?
8		Task 3	1	1 day?
9		Task 4	1	1 day?

Close the exercise file by clicking the **File** tab, Close button Close . Click **Yes** on the **Microsoft Project** dialog box.

Exercise 3.4: Entering the WBS for the Relocation Project

Instructions:

Open the *Relocation.mpp* file to continue your work. Check in ribbon **File**,  dialog box, tab **Schedule**, section **Scheduling options for this project** if the following options are selected:

- If the **New tasks created** is set to **Auto Scheduled**
- If the **Default task type** is set to **Fixed Duration**
- If the option **New tasks are effort-driven** is cleared

1. Enter the WBS into MS Project as shown in the table below.
2. Indent the detailed tasks under their summary tasks. The summary tasks are the tasks with names in capital letters.
3. Compare your file with the solution file *Exercise3c.mpp*.
4. Save your file when done.

ID	Task Name
1	REQUIREMENTS
2	Research staff requirements
3	Summarize requirements
4	LOCATION
5	Select the realtor
6	Visit the sites
7	Evaluate the sites
8	Meet to select the location
9	Legal review
10	Location selected
11	REMODELING CONTRACT
12	Select the contractor
13	Meet to discuss contract
14	Revise the schedule
15	Negotiate the contract
16	Contractor contracted
17	REMODELED LOCATION
18	Relocate walls
19	Install electric wiring
20	Paint
21	Drying of paint
22	Install cabinetry
23	Install LAN
24	Lay carpet
25	Facility remodeled

ID	Task Name
26	MOVE
27	Select mover
28	Pack
29	Move
30	Unpack
31	New location opened

Lesson 3 Checklist: Best Practices for the Work Breakdown Structure

Everything goes wrong, if the WBS isn't strong.

- Are there deliverables in the task list?
  If there are not, the schedule does not have a WBS. Deliverables should be captured using nouns (maybe with adjectives, but without verbs).

- Is the list of deliverables complete, but lean?
  - Are all expected deliverables explicitly included in the WBS?
  - Are the project management deliverables, like schedule and budget included in the WBS?
  - Are there only deliverables in the WBS that were explicitly agreed upon by the client or project sponsor?

- Does the WBS have a logical hierarchy?

- Is there one milestone for each deliverable?

Notes

Lesson 4: Entering Estimates

Topic 1: What are Estimates?

Topic 2: Setting MS Project Options

Topic 3: A Process for Estimating

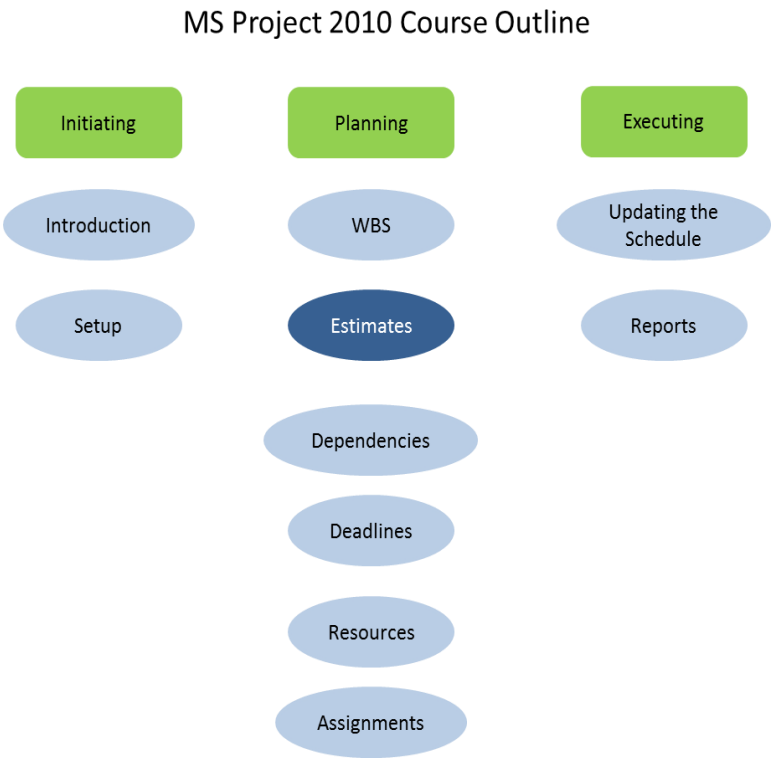
Topic 4: Moving and Copying Data

Student Learning Objectives

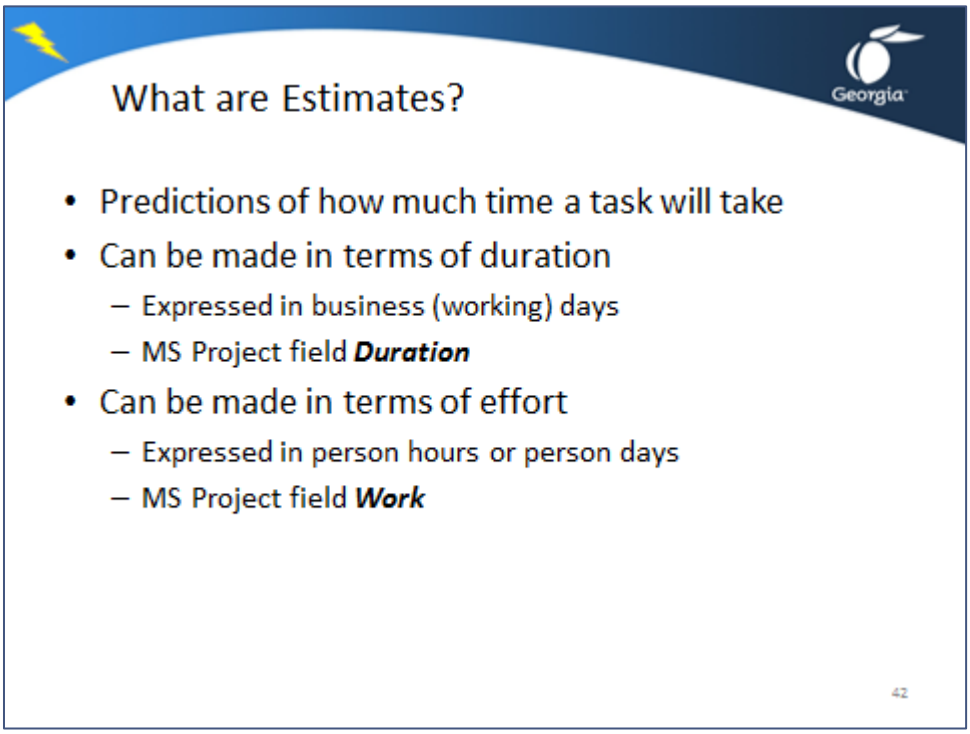
After completing this lesson you should be able to

- Understand the process for generating estimates
- Understand the difference between duration and work (effort) estimates
- Understand how to enter duration and work estimates into MS Project
- Understand how MS Project uses the formula **Duration * Peak Units = Work**
- Understand Pure Work and Gross Work time

Approximate Presentation time: 1 hour 15 minutes



Topic 1: What are Estimates?



Estimates are predictions of how much time a task will take. These predictions can be made in terms of the duration of a task or in terms of the effort required to perform a task. Notice the example below to see the difference between the two.

Duration versus work effort Example:
If you have 3 carpenters working for 2 business days (duration), the effort is 3 * 2 = 6 person days of effort.

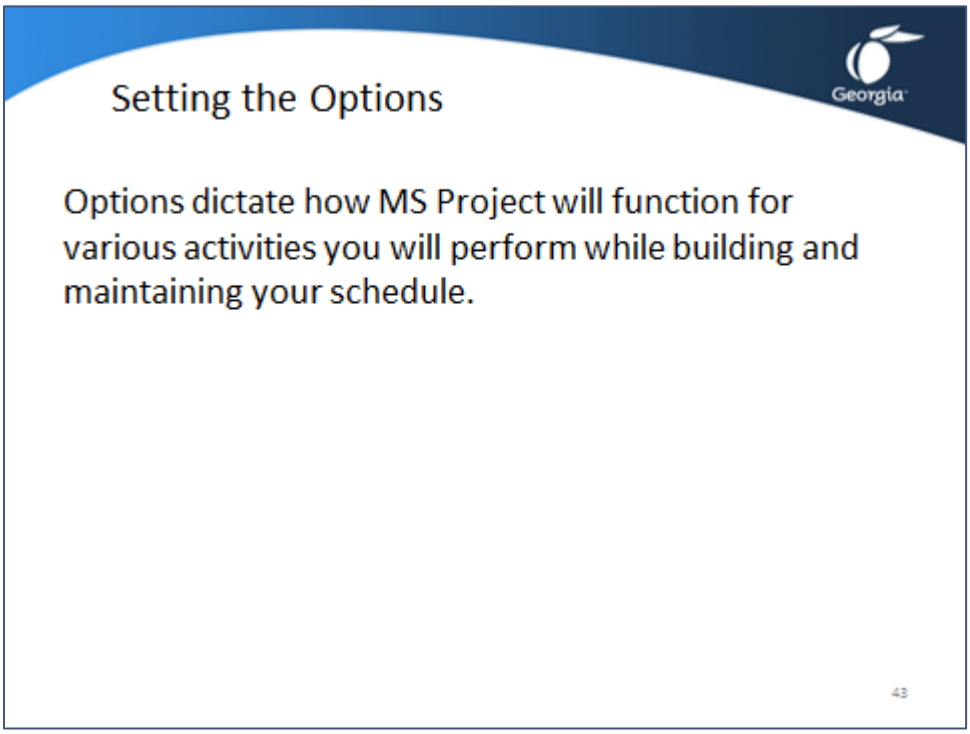
You express a duration estimate in *business days* (working days), which will be the weekdays in most cases. A business day has 8 hours in MS Project by default. Enter a duration estimate into the field **Duration**; the default time unit is **Days**. To enter duration of five days (1 week), you could type:

- *5 days*
- *5d*
- *5* (since the default time unit for **Duration** is days; ribbon **File**, **Options**, tab **Schedule**)
- *1w*

You express an effort estimate in *person hours* or *person days*. A person hour is one person working one hour. Enter the effort estimate into the task-related field **Work**. The default time unit of the **Work** field is **Hours**. To enter effort of 16 hours on a task, you could type:

- *16 hours*
- *16h*
- *16* (since the default time unit for **Work** is hours; ribbon **File**, **Options**, tab **Schedule**)
- *2d* (MS Project will convert this into the default time unit of hours)

Topic 2: Setting MS Project Options

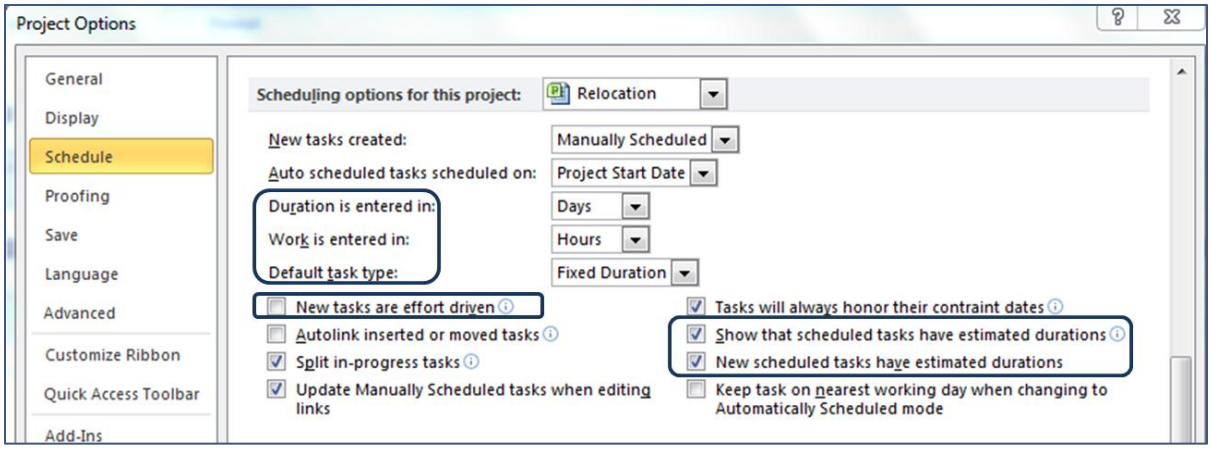


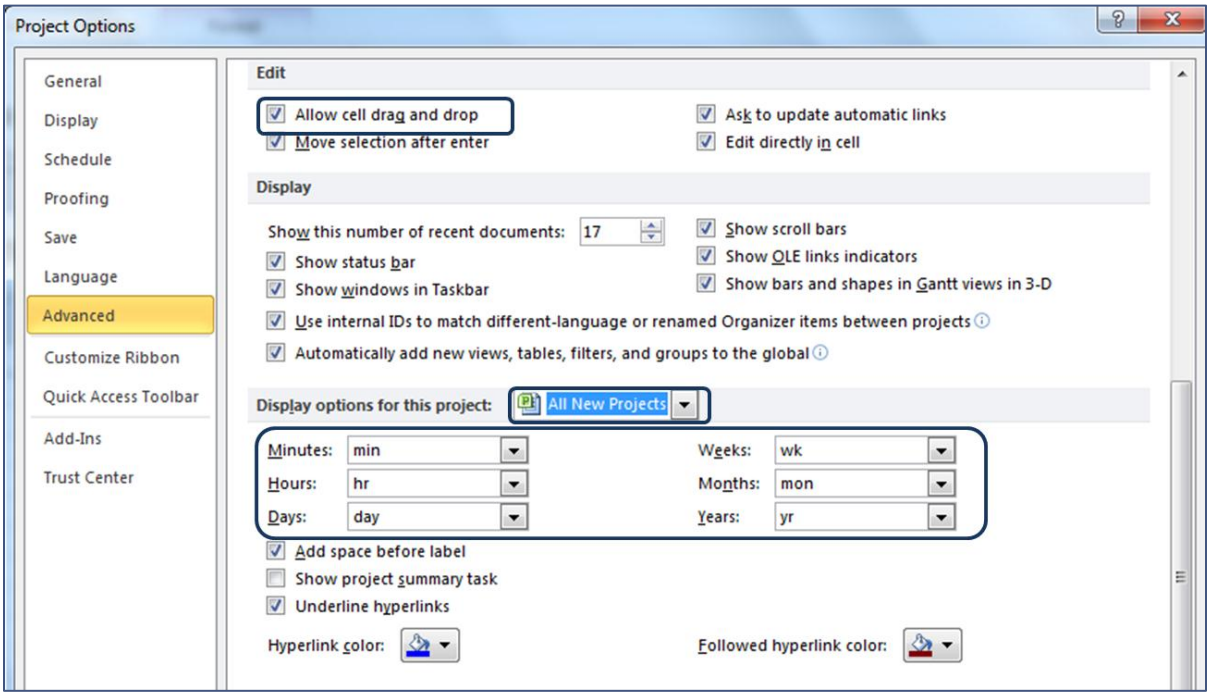
Before entering the estimates, it is important to understand how MS Project will function. Click ribbon **File**, **Options** and click on the tab indicated in the table below where you want to change settings.

Tab	Option
Schedule	Section **Scheduling options for this project:** **Duration is entered in:** MS Project will use the setting as the default time unit for the field *Duration*. With the default duration time unit set to days, you can type in 5 instead of 5d to get 5 days. You do not need to type a 'd' in the duration fields. Choose the unit that fits the majority of your inputs to save some keystrokes. The Duration field will display whatever time unit you entered.
	Work is entered in: Explanation is the same as for previous Duration field. Unlike the Duration field, the Work field will convert all entries to its default time unit. If you switch the time unit, MS Project will convert all values.
	Default task type: Most people enter the duration immediately, and MS Project should not change it, unless required. If you normally enter duration estimates rather than work (effort) estimates, we recommend setting it to **Fixed Duration**. If you normally enter work estimates we recommend setting it to **Fixed Work**.
	New Tasks are Effort Driven: (unchecked) When turned on, this option can change *assignment units* (the number of resources

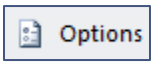
Tab	Option
	assigned); we recommend you turn it off. This option works similarly to the task type **Fixed Work**. We recommend you use the task **Type** instead of **Effort Driven**. The option takes effect only when you create new tasks.
	Show that scheduled tasks have estimated durations (checked) will add a question mark to the durations that you did not enter yourself.
	New scheduled tasks have estimated durations (checked) will add a question mark to durations of new tasks you may create.
Advanced	Section **Edit**: **Allow cell drag and drop** (checked) This allows you to move or copy the selected cells by dragging the selected area by its border. This option is global.
	Section **Display options for this project** **Minutes, Hours, Days, Weeks, Months,** and **Years** This allows you to change the way time units are shown in your project. The shorter you make the time unit, the more space you save. Select **All New Projects** first from the list if you want the short labels to be used from then on.

Topic 2: Setting MS Project Options





Exercise 4.1: Setting the Options for Estimating

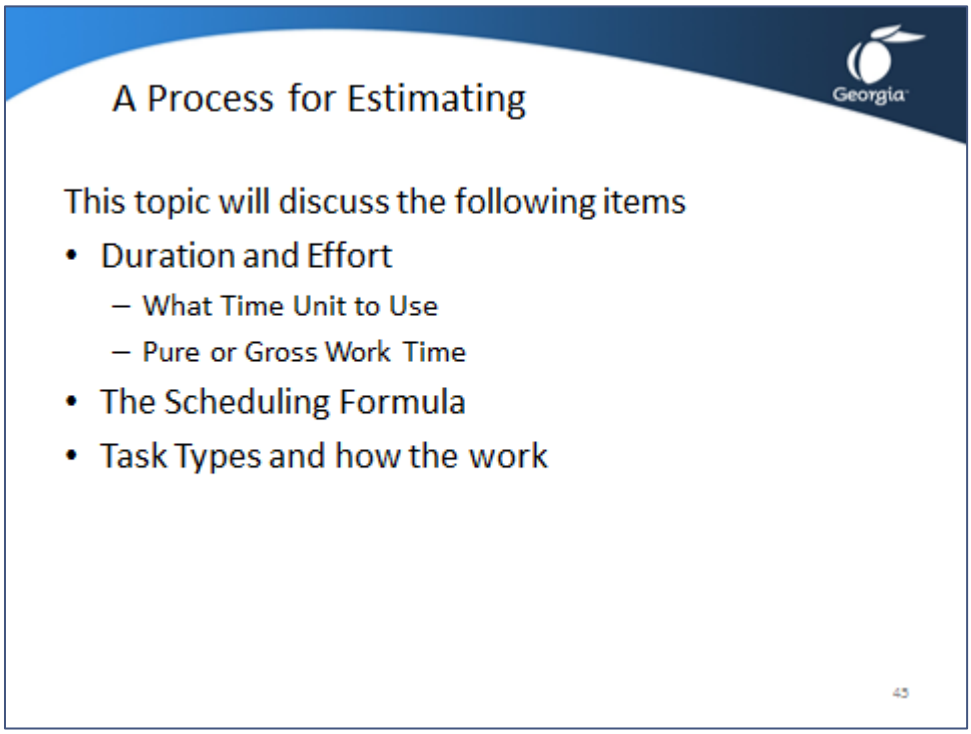
Instructions:
Open the *Exercise3c.mpp* file. To set the options related to estimating, click ribbon **File**, 

and click on the tab of the dialog box indicated in the table below.

Tab	Option
Schedule	Section **Scheduling options for this project:** **Duration is entered in:** Days
	Work is entered in: Hours
	Default task type: Fixed Duration
	New Tasks are Effort Driven: (unchecked)
	Show that scheduled tasks have estimated durations (checked)
	New scheduled tasks have estimated durations (checked)
Advanced	Section **Edit**: **Allow cell drag and drop** (checked)
	Section **Display options for this project** **Minutes:** min **Hours:** hr **Days:** day **Weeks:** wk **Months:** mon **Years:** yr

Click OK.
Close and save the file.

Topic 3: A Process for Estimating



This topic will have several parts to it and discuss how MS Project uses the scheduling formula and task types to develop estimates of duration and effort. First we will discuss the difference between **duration and effort** then explain the MS Project formula which works behind the screens. The next piece of the pie is the **task types** and how each will impact duration, work, and resource units. We will also recommend how you can set up the Gantt spreadsheet to use the estimating capabilities more effectively, and of course we will have several demonstrations and exercises to give you hands-on experience in estimating.

The Difference between Duration and Effort

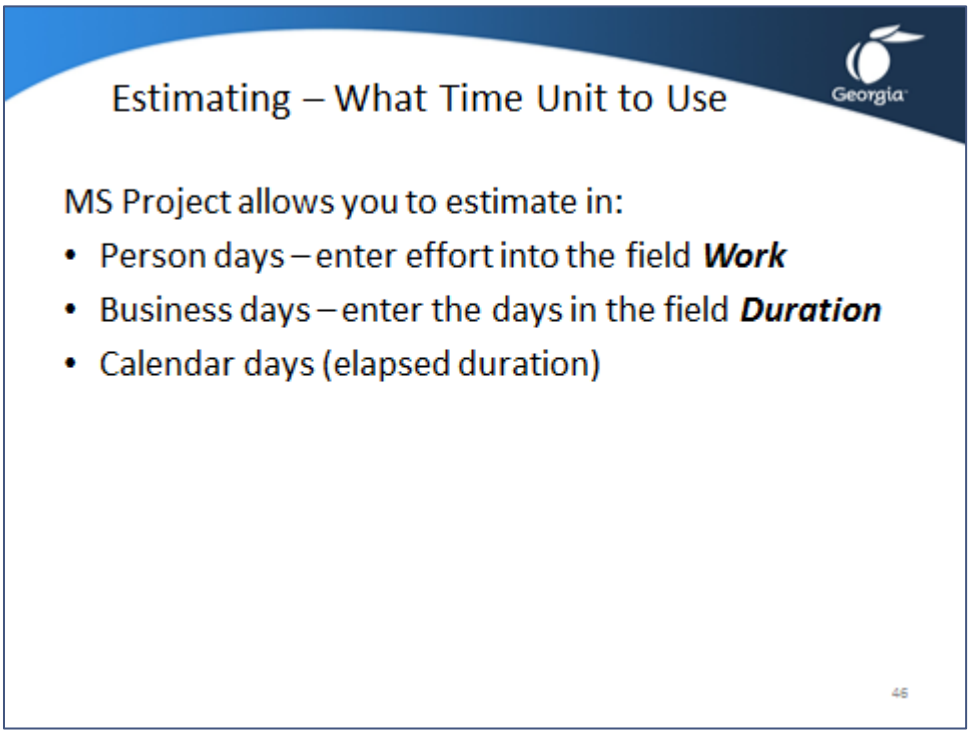
The *duration* of a task is the number of time units of working time the task will take. Duration is expressed in *business hours* or in *business days*.

The *work* is the number of *person hours* or *person days* planned or spent on a task. The term *work* in MS Project is synonymous with *effort* in daily life.

For example, one person who works for two business days (duration) delivers two person days of effort (work). Two painters who work for three business days (duration) to paint your house spend 2 * 3 = 6 person days of effort (work).

The business days are entered in the *Duration* field and the effort is entered in the *Work* field.

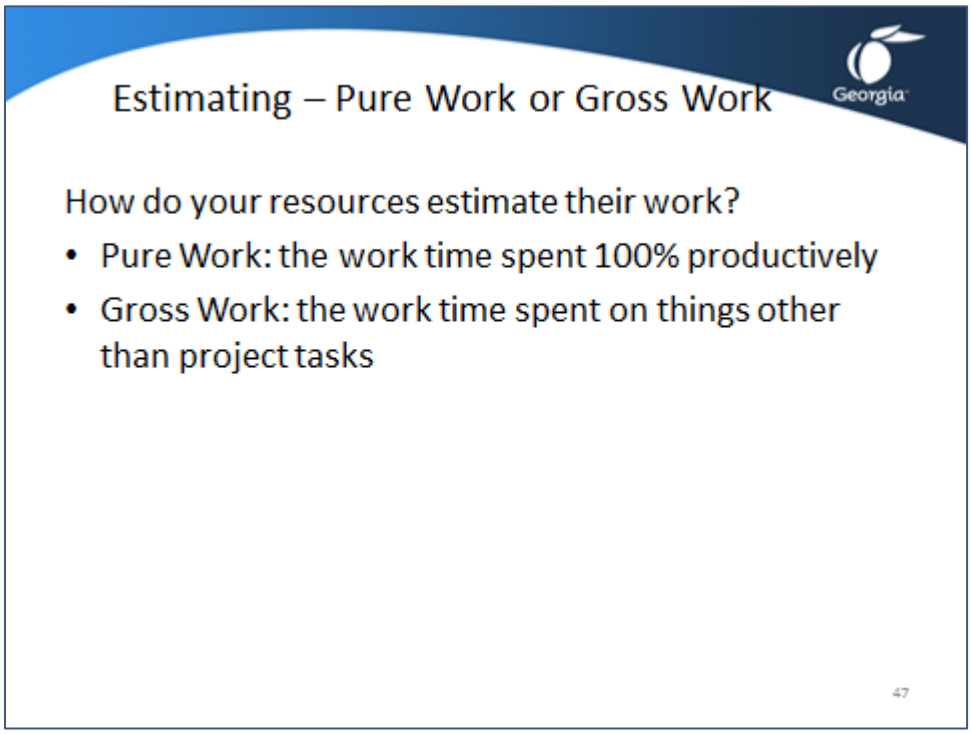
Topic 3: A Process for Estimating – What Time Unit to Use



Choose if you are going to express your estimates in person days, business days, or calendar days (elapsed duration):

- *Person* days
  One person day is one person working one full day. The number of person days is the amount of work or effort needed on the task. You enter the effort into the field **Work**. MS Projects needs the effort estimate to calculate cost of the project. Each person hour applied needs to be multiplied by the appropriate rate to arrive at the cost.
- *Business days*
  A business day is one working day. The number of working hours in a full working day is defined in ribbon **File**, **Options**, tab **Schedule**, **Hours per day**. You enter the number of full working days a task will take in the **Duration** field. MS Project needs to know the number of business days in order to calculate calendar days needed and the start and finish dates, which are used to create the Gantt Chart.
- *Calendar days*
  One calendar day is 24 hours; this is simply how everybody thinks of one day. You need to know the number of calendar days if you are asked to commit to a date on which you will deliver the project product. Calendar days are also known in MS Project as *elapsed days*.

Topic 3: A Process for Estimating – Pure Work Time or Gross Work Time

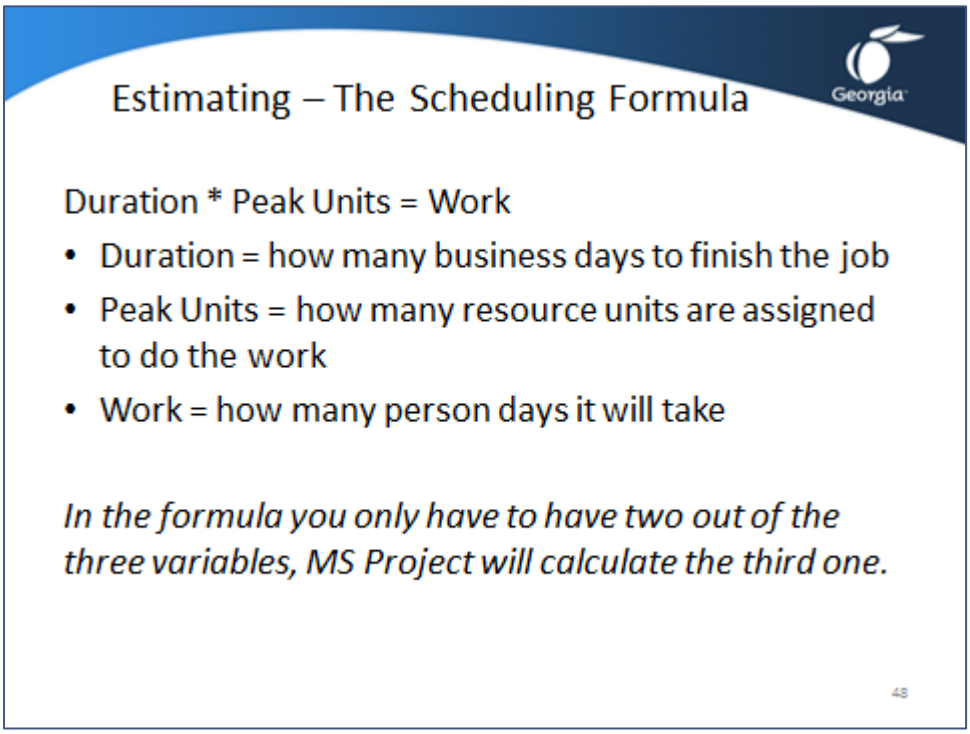


How do your resources estimate their time? Do they imagine being able to work full-time without interruptions? Do they include personal time, like visits to the restroom and calls, coffee breaks? Do they include time spent in meetings to discuss or present deliverables?

The term *Pure Work Time* expresses an important concept. Pure work time is work time spent 100% productively.

The term G*ross Work Time* includes time spent on things other than project tasks.

Topic 3: A Process for Estimating – The Scheduling Formula



MS Project uses the formula: **Duration * Peak Units = Work** behind its screens:

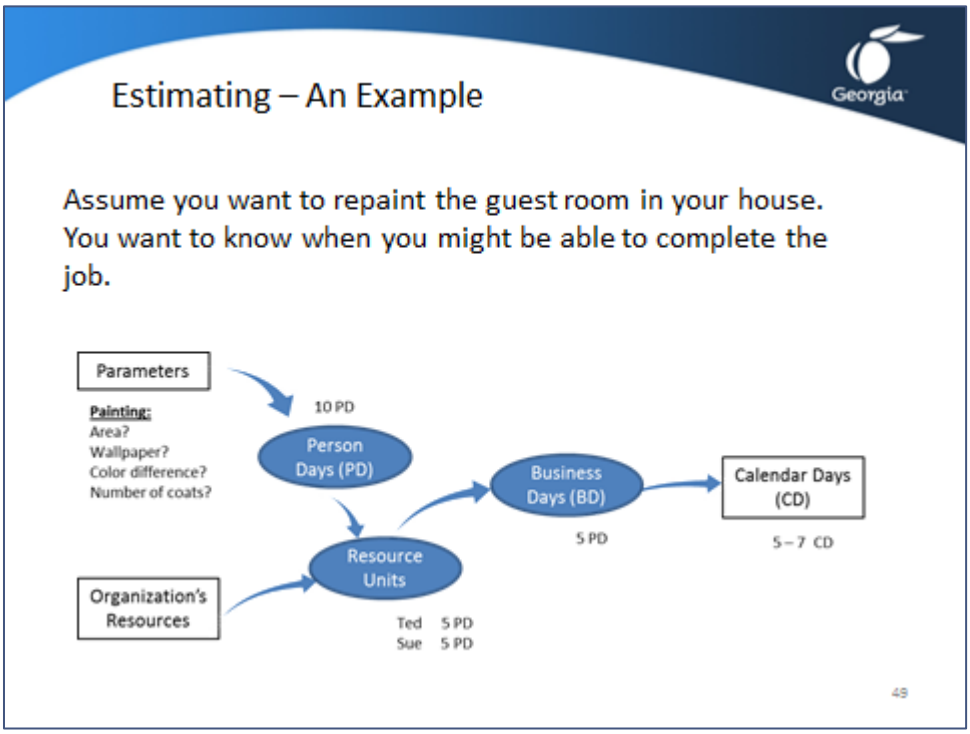
- *Duration* is how many *business days* you have to finish the job.
- *Peak Units* are how many *resource units* are assigned to the task to do the work.
- *Work* is how many *person days* it will take.

In the formula you only have to have two out of the three variables in the formula in order to calculate the third one. However, if you are not aware of how the formula works MS Project will start filling in fields for you that you did not expect it would. This can cause great frustration with the tool and make it more difficult to manage the schedule.

Given the aspects of the estimating formula, we recommend the following:

- **Manually Scheduled** tasks do not allow you to change the task **Type**, so change the field **Task Mode** first to **Auto Scheduled**.
- Estimate the **Duration** OR the **Work** and enter it.
  The first variable in the formula is given in most project situations. It is the estimate you first come up with. In most situations, you know the *duration* or the *work* first.
- Protect the estimate by setting the task **Type** field accordingly. MS Project has three task types: *Fixed Duration, Fixed Units,* and *Fixed Work*. If you entered a **Duration** estimate, you set the task **Type** to **Fixed Duration**. If you entered a **Work** estimate, you set the task **Type** to **Fixed Work**. This will protect the number from any calculating by MS Project with its **Duration * Peak Units = Work** formula.

Topic 3: A Process for Estimating – Estimating Example



Assume you want to repaint the guest room in your house. You want to know when you might be able to complete the job; you need to know the *calendar days* this task will take.

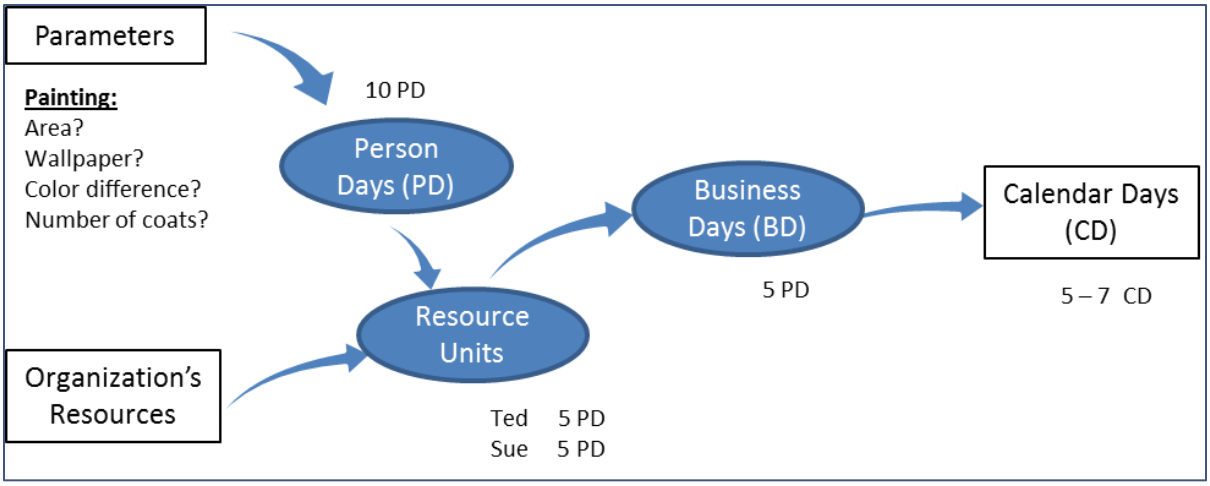
Estimating the *calendar days*, however, is very difficult so you step back and try to estimate the number of *business days* or *workdays* the job will take.

Once you know the number of business days and the day of the week on which you sill start you can convert the business days to calendar days. MS Project can do this for you if you enter your weekend days and holidays on the project calendar.

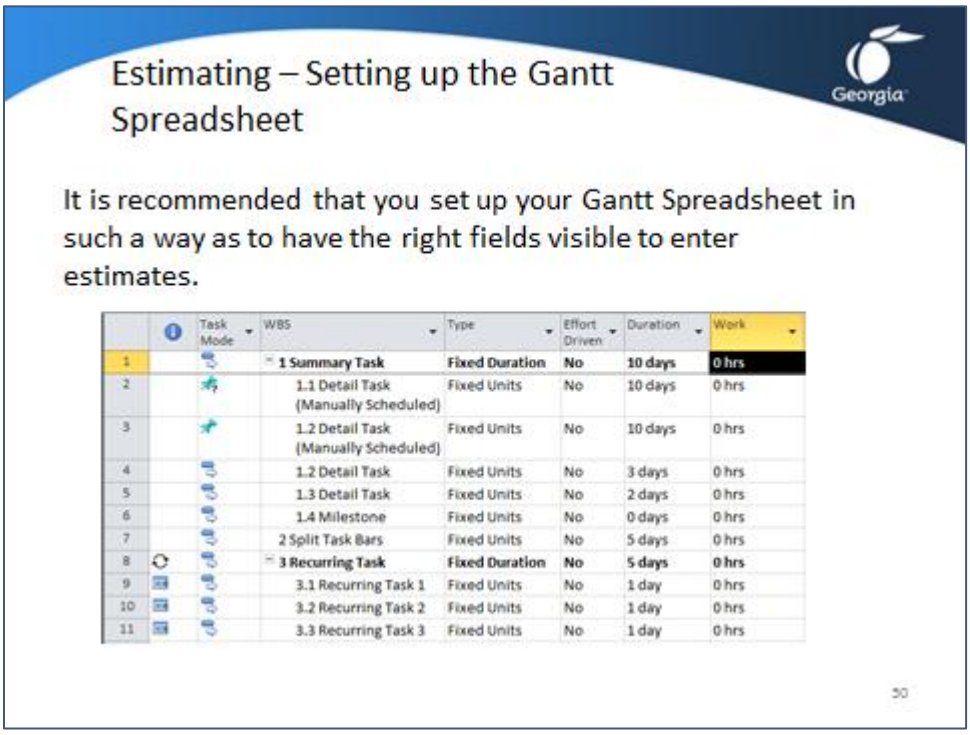
Estimating in business days may be difficult as well, because you do not know how many resources will be available. Now you will focus on a *person day* estimate that represents the effort of the task. To do that look at the painting parameters: (What you will do with the wall paper; area to be painted; difference between old color and new color; and the number of coats needed). After reviewing all of the factors you decide it will take **10 person days of effort**.

You still cannot say how many business days this requires, because you have no firm commitments from family or friends to help you. After asking around you find that your significant other is willing to help and that the two of you will share the workload equally. This means that each of you will take 5 person days of effort in the 10 person days total; **10 person days of effort** can be delivered by **2 people** in **5 business days**: *Ted 5 PD (person days) and Sue 5 PD.*

If you start on a Monday, you can have the room painted by Friday (5 business days and 5 calendar days). However, if you start on a Tuesday and decide not to work on the weekend, you will be done on Monday of the next week (5 business days but 7 calendar days). You now know what you wanted to know: the project end date.



Topic 3: A Process for Estimating – Setting up the Gantt Spreadsheet



	Task Mode	WBS	Type	Effort Driven	Duration	Work
1		**1 Summary Task**	**Fixed Duration**	**No**	**10 days**	**0 hrs**
2		1.1 Detail Task (Manually Scheduled)	Fixed Units	No	10 days	0 hrs
3		1.2 Detail Task (Manually Scheduled)	Fixed Units	No	10 days	0 hrs
4		1.2 Detail Task	Fixed Units	No	3 days	0 hrs
5		1.3 Detail Task	Fixed Units	No	2 days	0 hrs
6		1.4 Milestone	Fixed Units	No	0 days	0 hrs
7		2 Split Task Bars	Fixed Units	No	5 days	0 hrs
8		**3 Recurring Task**	**Fixed Duration**	**No**	**5 days**	**0 hrs**
9		3.1 Recurring Task 1	Fixed Units	No	1 day	0 hrs
10		3.2 Recurring Task 2	Fixed Units	No	1 day	0 hrs
11		3.3 Recurring Task 3	Fixed Units	No	1 day	0 hrs

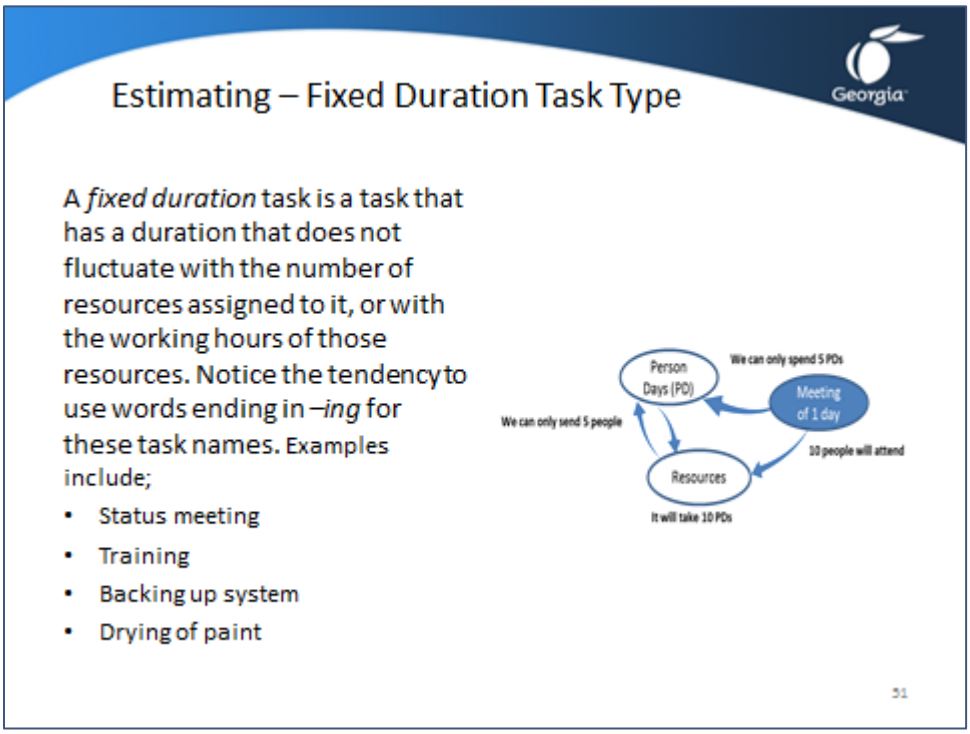
It is recommended you prepare the Gantt spreadsheet so you have the right fields for entering estimates. The illustration below is what you want your Gantt spreadsheet to look like.

The following fields should be set up in the Gantt spreadsheet:

- **ID**
- **Task Mode**: You can change tasks from **Manually Scheduled** to **Auto Scheduled** in this field. Only **Auto Scheduled** tasks allow you to change the task **Type** to **Fixed Duration or Fixed Work**.
- **Task Name**: note that the database name is simply **Name**. It is recommended to change the title of the field to **WBS** by right clicking the column heading and clicking **Field Settings**.
- **Type**: by setting the right task type you tell MS Project to leave the entered estimate alone.
- **Effort Driven**: MS Project always sets the field to **Yes** for **Fixed Work** tasks. It is recommended you keep **Effort Driven** to **No** for *Fixed Duration* and *Fixed Unit* tasks.
- **Duration**: to enter the duration estimate for *Fixed Duration* tasks.
- **Work**: to enter the effort estimate for *Fixed Work* tasks.

		Task Mode	WBS	Type	Effort Driven	Duration	Work
1			**1 Summary Task**	**Fixed Duration**	**No**	**10 days**	**0 hrs**
2			1.1 Detail Task (Manually Scheduled)	Fixed Units	No	10 days	0 hrs
3			1.2 Detail Task (Manually Scheduled)	Fixed Units	No	10 days	0 hrs
4			1.2 Detail Task	Fixed Units	No	3 days	0 hrs
5			1.3 Detail Task	Fixed Units	No	2 days	0 hrs
6			1.4 Milestone	Fixed Units	No	0 days	0 hrs
7			2 Split Task Bars	Fixed Units	No	5 days	0 hrs
8			**3 Recurring Task**	**Fixed Duration**	**No**	**5 days**	**0 hrs**
9			3.1 Recurring Task 1	Fixed Units	No	1 day	0 hrs
10			3.2 Recurring Task 2	Fixed Units	No	1 day	0 hrs
11			3.3 Recurring Task 3	Fixed Units	No	1 day	0 hrs

Topic 3: A Process for Estimating – Fixed Duration Task Type

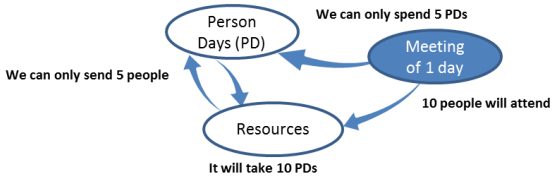


Fixed Duration tasks

A *fixed duration* task is a task that has a duration that does not fluctuate with the number of resources assigned to it, or with the working hours of those resources. Notice the tendency to use words ending in –*ing* for these task names. Examples include;

- Status meeting
- Training
- Backing up system
- Drying of paint

For *Fixed Duration* tasks, enter the duration first. A task such as *meeting* is a prime example because you decide the duration up front. Then you can decide who you will invite to the meeting and *assign* the number of units (clockwise arrows in the illustration). Once you have assigned the number of resource units, MS Project will calculate the total amount of work.

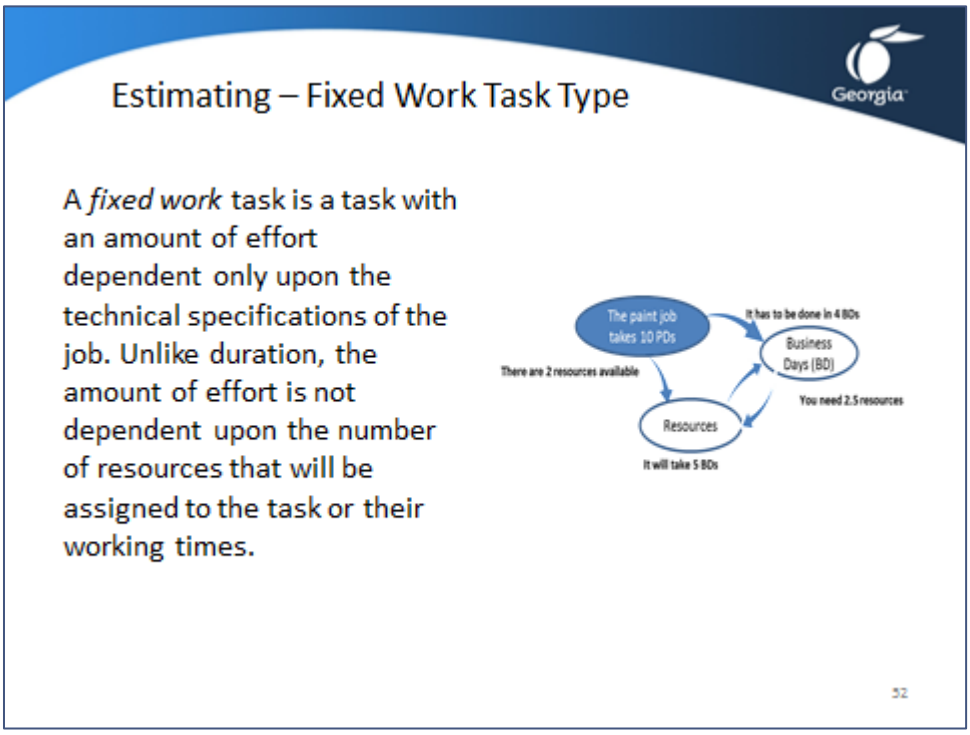


To enter a Fixed Duration task:

1. Change field **Task Mode** to **Auto Scheduled**. This will allow you to change the task **Type** field.
2. Enter the name of the task in the field **Task Name**.

3. Change field **Type** to **Fixed Duration**. This will prevent MS Project from changing this estimate.
4. Change field **Effort Driven** to **No**.
5. In the **Duration** field enter the number of business days you estimate the task will take. This will override the default duration of **1 day?** that MS Project had entered.

Topic 3: A Process for Estimating – Fixed Work Task Type



Fixed Work tasks

A *fixed work* task is a task with an amount of effort dependent only upon the technical specifications of the job. Unlike duration, the amount of effort is not dependent upon the number of resources that will be assigned to the task or their working times (*resource calendars*).

Once you determine the amount of work, you will often find that your next step will be to establish how many resources will do the job (counter clockwise arrows in the illustration). When you know the work and the number of resource units, MS Project will derive the number of business days (duration).

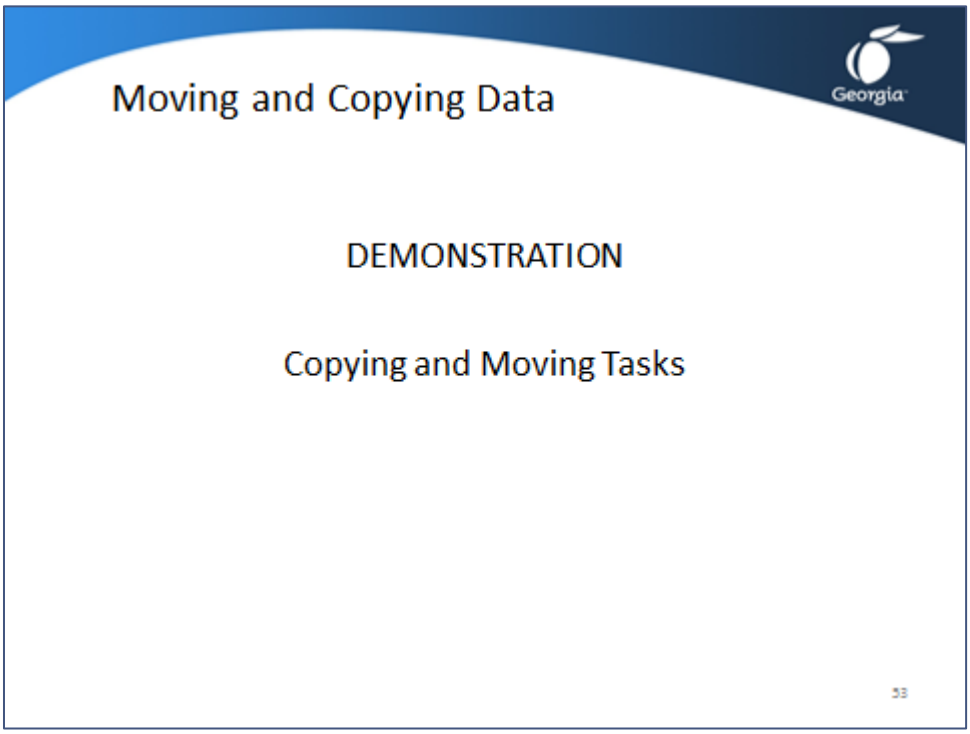
Once you know the amount of work (10 person days), you sometimes know the number of business days required to do the work (clockwise arrows in the illustration). Let's say you have only 4 business days for the task (duration). From this MS Project can derive the number of resources you need: 2.5.

To enter a Fixed Work task:

1. Change field **Task Mode** to **Auto Scheduled**. This will allow you to change the task **Type** field.
2. Enter the name of the task in the field **Task Name**. Notice that MS Project already entered a *default duration* of **1 day?** in the **Duration** field.

3. Change field **Type** to **Fixed Work**. This will prevent MS Project from changing the estimate you will enter.
4. The field **Effort Driven** is automatically set to **Yes**; it cannot be changed for **Fixed Work** tasks.
5. In the Work field enter the number of person hours you estimate the task will take.

Topic 4: Copying and Moving Data

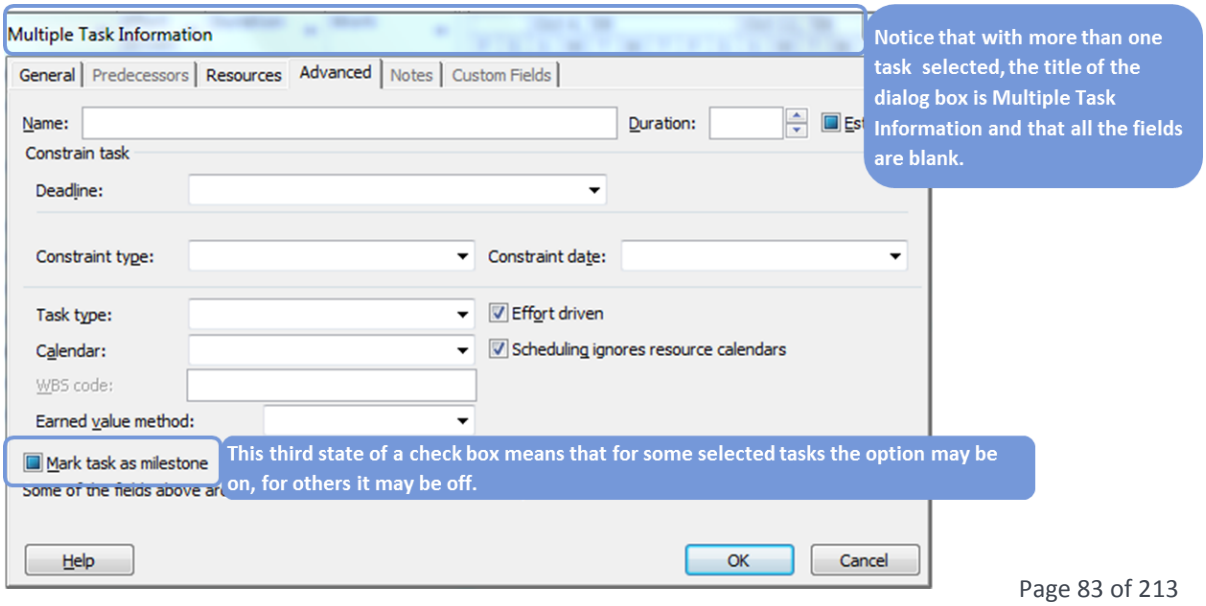


This topic will cover several quick ways to copy and move data in MS Project. Open the demonstration file **Demo Lesson 4 Moving and Copying**.

Editing Fields of Multiple Tasks at Once

1. Select the tasks by clicking on the first task, then hold down the **Ctrl** key while clicking on the next ones until they are selected.
2. Click ribbon Task and find the Properties section. Click 

- the **Multiple Task Information** dialog appears:



3. Make the changes needed on each tab.
4. Click **OK**.

The Multiple Task Information dialog can be used as a time saver for many purposes, for example:

- Setting the duration of all the milestones to 0 (zero) and clearing the **Estimated** check box to make question marks disappear.
- Changing the task type on the **Advanced** tab in the field **Task type**.
- Assigning a resource to many tasks at once on the tab **Resource**.

Copying with Fill Down

1. Enter the value that you want to copy down in the top cell.
2. Click and hold down the top cell and drag down over all adjacent cells you want to fill.
3. Right-click within the selected area and select **Fill Down**
   OR
   Click ribbon **Task** and find the **Editing** section. Click 

   and select **Down** from the drop-down menu.

Examples when you would use the fill down feature:

- Changing the constraint types for many tasks. To get rid of constraints, fill *As Soon As Possible* in the field *Constraint Type*.
- Enter a certain **Task Mode** or task **Type** for many tasks at once.

Fill Up or Fill Down Using the Fill Handle

1. Enter the value you wish to fill in the top or the bottom cell of the area to be filled.
2. Make sure you have the cell selected and at the bottom right of the cell you will see a fill handle 

3. Point to the fill handle; watch the mouse pointer: 

4. When you see a crosshair mouse pointer, click and hold down and drag over the cells to be filled. Note that you can only fill adjacent cells in this way.

Copying, Moving or Clearing Cells

Upfront remarks:

- When copying or moving cells, you have to make sure that the receiving cells can accommodate the type of data.
- Paste the data into blank cell; otherwise existing cells may be overwritten. Click **Undo**  on the **Quick Access Toolbar** when an accident occurs.
- Unlike Excel, MS Project will only paste the value into the first cell of all paste cells you select.

Copying Cells

Select the cells and click Copy on the **Task** ribbon, then select the cells to paste into and click the top part of Paste.

Moving Cells

Select the cells and click Cut on the **Task** ribbon, then select the cells to paste into and click the top part of Paste.

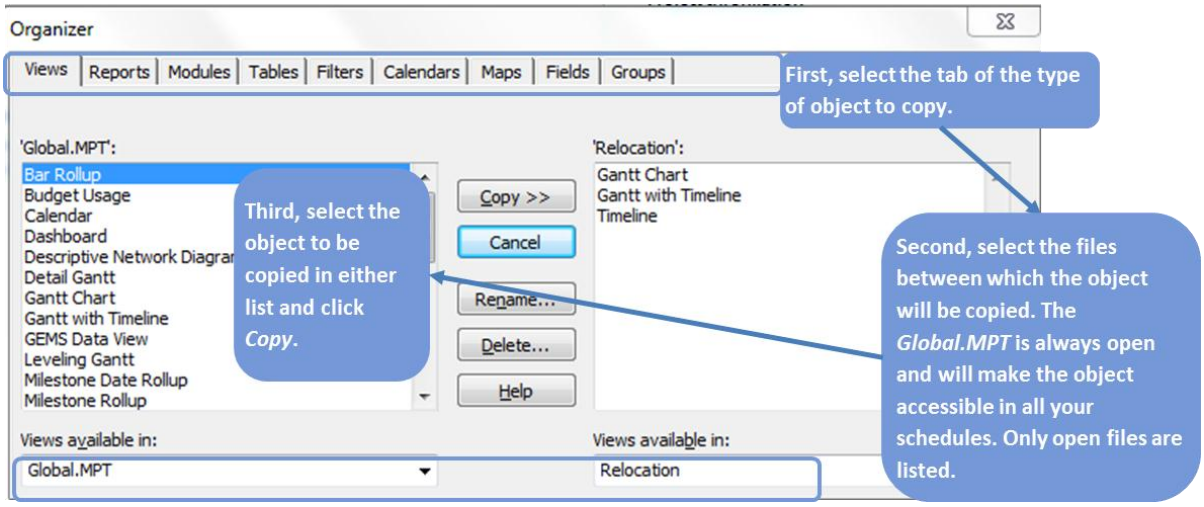
Copying or Moving the Data in an Entire Column

1. Select the whole column by clicking on its column heading.
2. Select the cells, click ribbon **Task** and click Copy.
3. Click the column heading into which you want to paste the data.
4. Click the top part of Paste (**Task** ribbon).

Copying Objects between Projects (the Organizer)

Objects are views, reports, calendars and other things that change the appearance of the data or affect the scheduling. Copy objects between projects using the *Organizer*.

1. Click ribbon **File**, tab **Info**, button **Organizer** – the **Organizer** dialog appears:



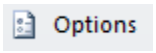
2. Click on the tab of the type of objects to transfer.
3. From the lists at the bottom of the dialog select the schedule from which to copy the object; in the other list, select the schedule to copy to. Only the files currently open will be in the list.
4. Select the object and click Copy >> to copy from the list to the right or << Copy to copy from right to left.
5. Click Close when done.

Exercise 4.2: Entering Estimates for the Relocation Project

Instructions:

The goal of this exercise is to be able to enter duration and work estimates and protect them by setting the task type accordingly.

Insert the fields *Type, Effort Driven, Duration,* and *Work* in the Gantt spreadsheet in the order they appear in the column headings in the table below.

Open the *Relocation.mpp* file to continue your work. Check in ribbon **File**, 

dialog box, tab **Schedule**, if the following options are selected:

- Time unit for **Work is entered in** is set to **Days**.
- **New tasks created** is set to **Auto Scheduled**

1. Enter the data from the table below. Please note:
    a. The tasks with zero duration will become milestones
    b. Where no data are provided (blank cell), do not enter anything; MS Project will fill in the default duration of *1 day?* and the default work of *0 days*. Leave these as they are; you cannot blank them out.
2. Compare your file with the solution file *Exercise4.mpp*.
3. Save your file when done.

ID	**Task Name**	Type	Effort Driven	Duration	Work
1	REQUIREMENTS	Fixed Duration	No		
2	Research staff requirements	Fixed Work	Yes		2 d
3	Summarize requirements	Fixed Work	Yes		2 d
4	LOCATION	Fixed Duration	No		
5	Select the realtor	Fixed Duration	No	4 d	
6	Visit the sites	Fixed Duration	No	1 d	
7	Evaluate the sites	Fixed Duration	No	1 d	
8	Meet to select the location	Fixed Duration	No	1 d	
9	Legal review	Fixed Duration	No	0.5 d	
10	Location selected	Fixed Duration	No	0 d	
11	REMODELING CONTRACT	Fixed Duration	No		
12	Select the contractor	Fixed Duration	No	2 d	
13	Meet to discuss contract	Fixed Duration	No	1 d	
14	Revise the schedule	Fixed Duration	No	1 d	
15	Negotiate the contract	Fixed Duration	No	1 d	
16	Contractor contracted	Fixed Duration	No	0 d	
17	REMODELED LOCATION	Fixed Duration	No		
18	Relocate walls	Fixed Work	Yes		100 d
19	Install electric wiring	Fixed Work	Yes		25 d
20	Paint	Fixed Work	Yes		8 d

ID	Task Name	Type	Effort Driven	Duration	Work
21	Drying of paint	Fixed Duration	No	4 ed	
22	Install cabinetry	Fixed Work	Yes		40 d
23	Install LAN	Fixed Work	Yes		60 d
24	Lay carpet	Fixed Work	Yes		60 d
25	Facility remodeled	Fixed Duration	No	0 d	
26	MOVE	Fixed Duration	No		
27	Select mover	Fixed Duration	No	2 d	
28	Pack	Fixed Duration	No	2 d	
29	Move	Fixed Work	Yes		20 d
30	Unpack	Fixed Duration	No	2 d	
31	New location opened	Fixed Duration	No	0 d	

Lesson 4 Checklist: Best Practices for Entering Estimates

- Do all tasks have an estimate?
    - **Manually Scheduled** tasks: If one of the essential pieces of data is missing i.e. duration, start, or finish, the task is called *unscheduled* and is just a placeholder with its **Placeholder** field set to **Yes**. By filtering on this field you can easily check if you have entered all estimates.
    - **Auto Scheduled** tasks**:** these tasks always have the three pieces of information, because MS Project will enter default durations of 1 day, if needed, and dates (the project start date as the default start date). You can perform this check by applying the filter **4.1 All Estimates Entered?**

- Are the estimates that you collected consistent with the working hours entered in the Standard (Project Calendar)?
  If they are not consistent the schedule will be too long or too short.
    - Gross working time estimates should be entered in a schedule with gross working hours on the project calendar (typically 8:00 AM – 5:00 PM).
    - Pure working time estimates should be entered in a schedule with the pure working hours on the project calendar – a shorter working day. If you estimate that the productive hours are 70% of the time spent at work, the working hours should be 70% * 8h = 5.6 hours, rounded to 5.5 hours. Working hours correspond to this are, for example, 9:00 AM – 12:00 PM and 1:00 PM – 3:30 PM. It is recommended that you set the working hours like these on the project calendar if you want to work with pure work time estimates.

- Are the *estimates* reasonable given the work that needs to be performed?
    - Some types of tasks are easily underestimated; for example, writing documents takes a lot of time, at least 2 hours per page. For other tasks, you will need some subject matter expertise to verify the estimates.
    - Sometimes estimates are overestimated. Some project managers incorporate waiting time into duration estimates. Waiting time is more appropriately modeled as a lag on the dependency. Reviews or approval cycles include waiting times.

- Is the amount of effort on overhead tasks reasonable compared to the total amount of effort (Work)?
  The percent of overhead effort needs to be between 10% and 30% of the total effort in the project.

Notes

Lesson 5: Entering Dependencies

Topic 1: Dependencies and Dynamic Scheduling

Topic 2: What are Dependencies?

Topic 3: Types of Dependencies

Topic 4: Using Lead or Lag

Topic 5: Entering Dependencies in the Gantt View

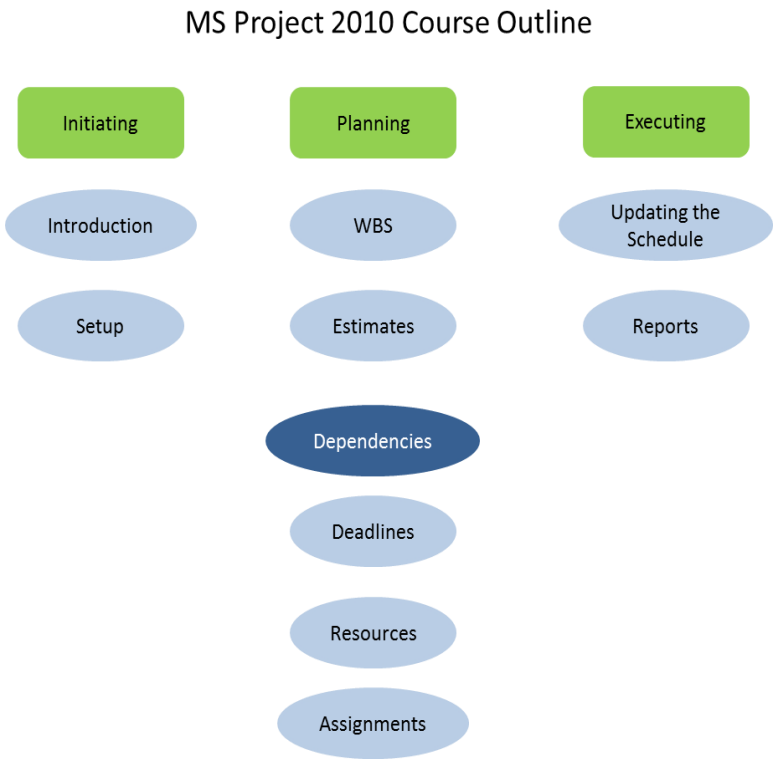
Topic 6: The Network Diagram

Student Learning Objectives

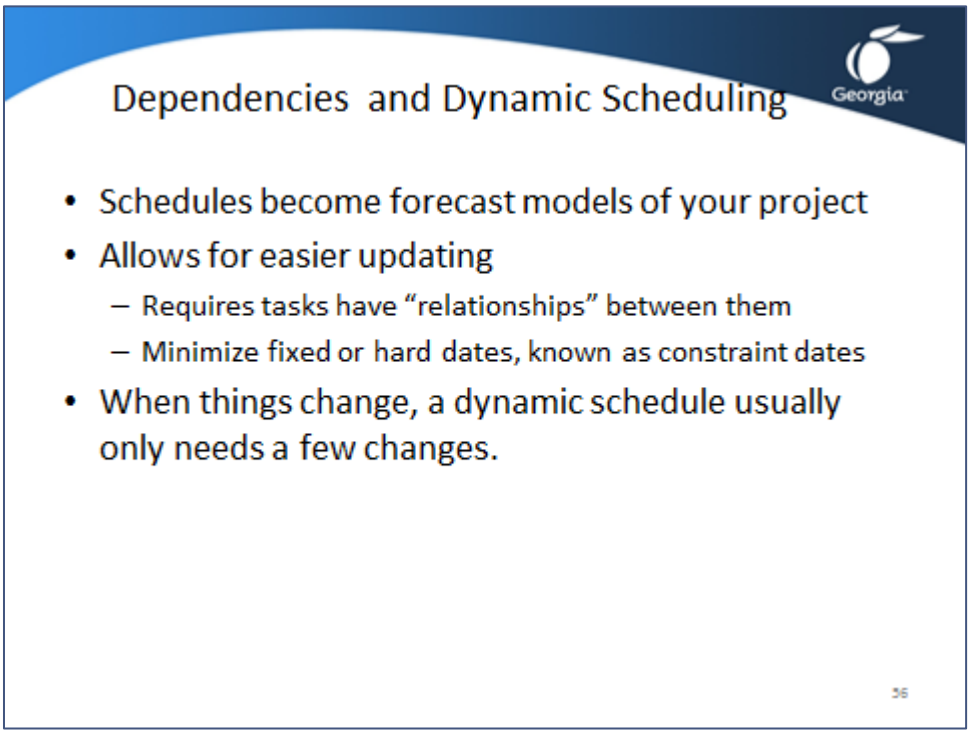
After completing this lesson you should be able to

- Understand what dependencies are and think of them in terms of cause-and-effect relationships
- Understand how to choose the right dependencies and enter them into MS Project
- Understand the concepts of lead and lag and how to use them
- Understand the Network Diagram

Approximate Presentation time: 1 hour 15 minutes



Topic 1: Dependencies and Dynamic Scheduling

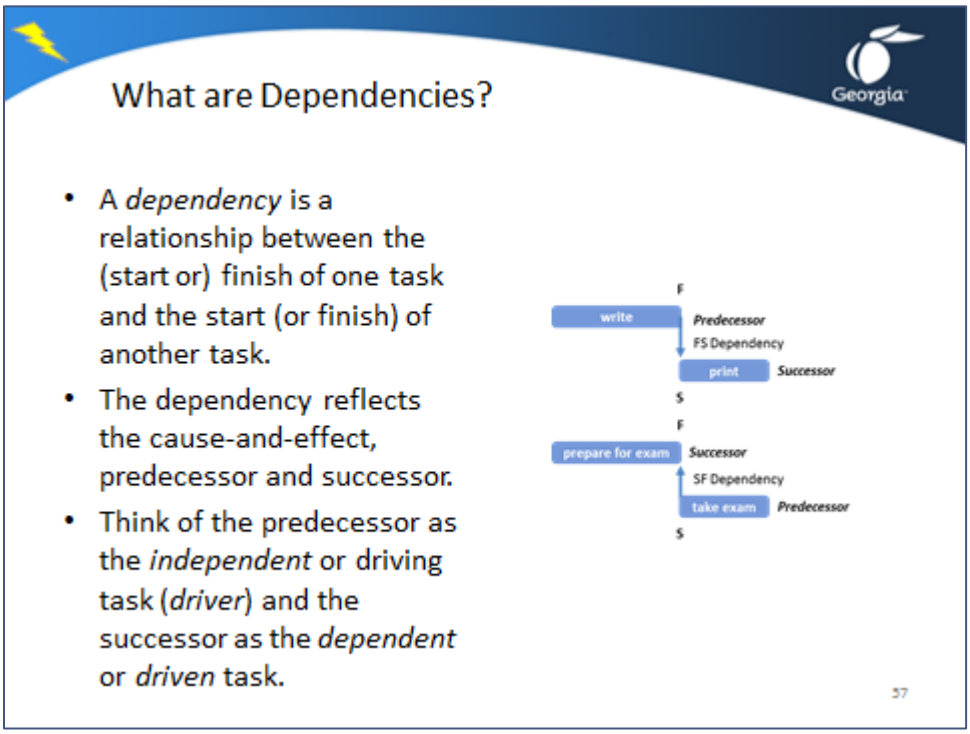


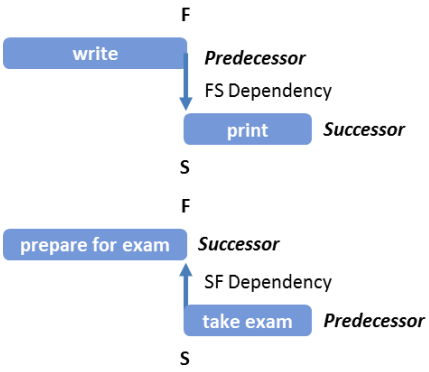
Dynamic scheduling is not just a fashionable term – it can actually help you. Think of a schedule as a forecast model that reflects your real-life project all the time and allows for easy updating when you get busy during project execution. To achieve this result your schedule needs to meet the following requirements:

- You find and enter all the *relationships* between the tasks that may impact your forecasts. These forecasts are called "*dependencies*".
- You minimize the number of *hard dates* in your schedule. Hard dates or *fixed dates* are called *constraints* in MS Project. They will be discussed in the next lesson.

Every time a change happens in your project you need to change the schedule to reflect the new reality. If you have a static model, you need to review the dates of all future tasks every time and adjust many of them. If you have a dynamic model, when one thing changes in your real-life project, ideally you would have to change only one field in your MS Project model.

Topic 2: What are Dependencies?





A *dependency* is a relationship between the (start or) finish of one task and the start (or finish) of another task. The dependency reflects the cause-and-effect, or logical *relationship* between the two tasks. The dependency shown in the illustration causes the finish of the independent task write (predecessor) to drive the start of the dependent task print (successor); when the finish date of write changes the start date of print will move with it. If write extends or slips, print will slip.

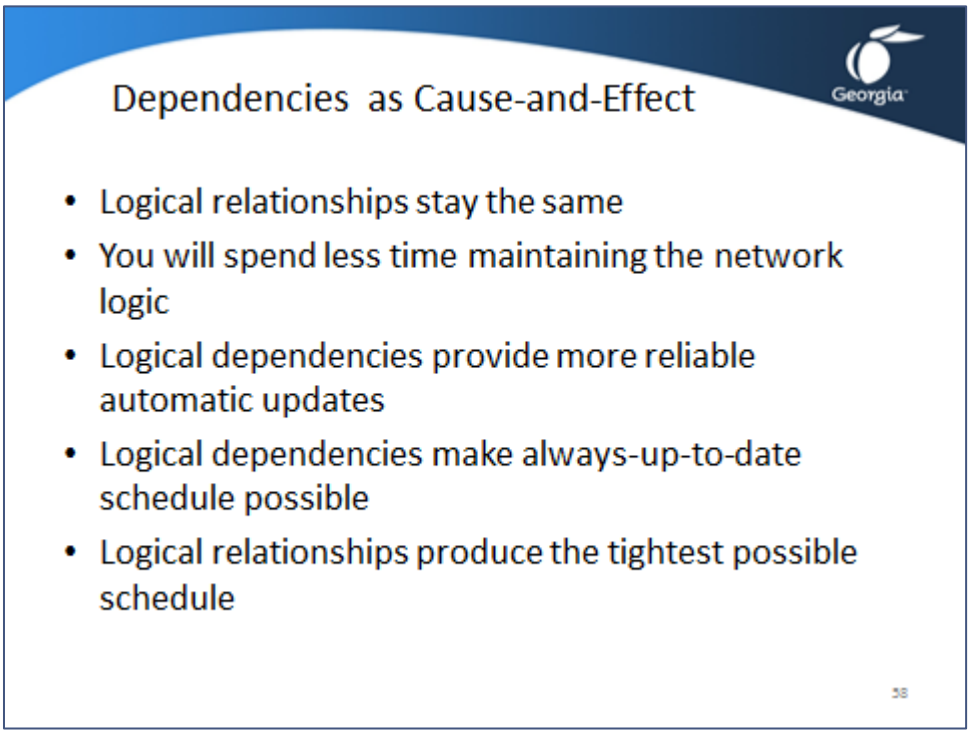
The words *predecessor* and *successor* are misleading, because they imply chronology; the predecessor precedes and the successor succeeds. Dependencies are not a matter of chronology, but about cause-and –effect. These can come from:

- *Practical necessities*: the book needs to be written before it can be printed.
- *Mandatory processes*: if your organization requires a quality review before releasing a report, this would create a dependency.

Think of the predecessor as the *independent* or driving task (*driver*) and the successor as the *dependent* or *driven* task. In order to find the predecessor; the right question to ask is "*Which task drives the other task?*" In the illustration consider the tasks "*prepare for exam*" and "*take exam*",

which drives the other? This question produces the right dependency (Start-to-Finish from exam to prepare). If you ask the question: *Which of the tasks precedes the other?,* you get the wrong dependency (Finish-to-Start from prepare to exam). This is wrong because it will move the exam date when preparing takes longer. If the exam date is changed, the preparation should be rescheduled, because the exam date has an impact on the timing of preparation. Remember the arrow always points in the direction the impact goes.

Topic 2: Dependencies Treated as Cause-and-Effect

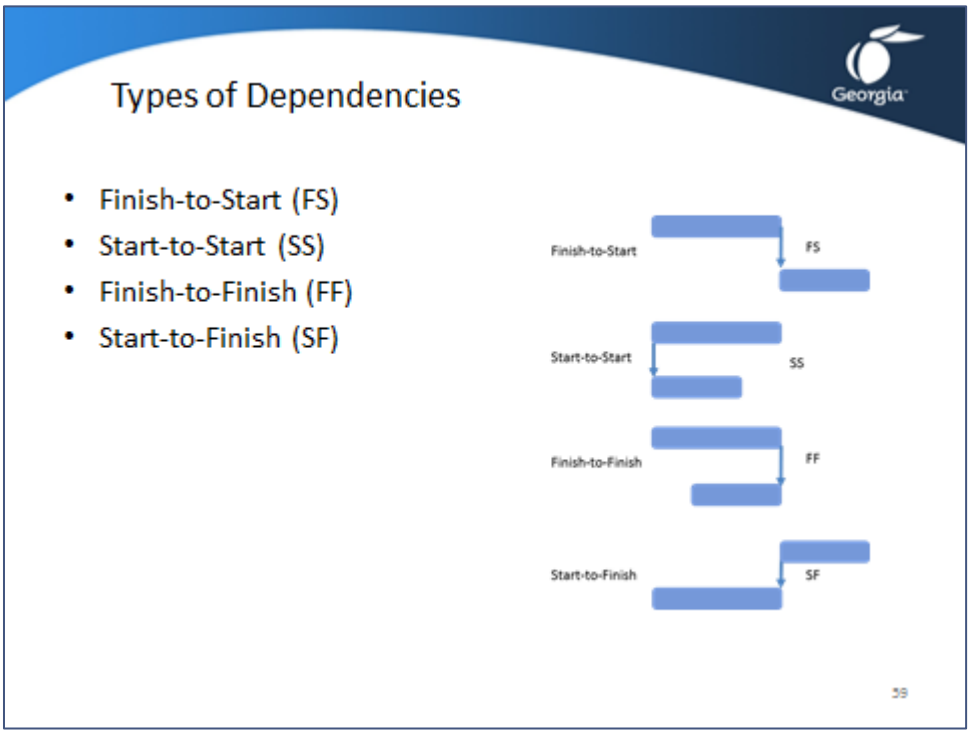


There are several reasons for treating dependencies as logical relationships (cause-and-effect) rather than as chronological relationships (precede and succeed):

- **Logical relationships stay the same**
  Logical relationships do not change over time, whereas chronological relationships may need to be adjusted when a task slips or extends.
- **You will spend less time maintaining the network logic**
  With a logical relationship, if one thing changes, you need to change only one thing in the schedule. If you use chronological relationships, you often have to change other chronological dependencies as well. Ask yourself, *Do I often change dependencies during project execution?* If the answer is yes, you have been creating chronological dependencies rather than logical dependencies.
- **Logical dependencies provide more reliable automatic updates**
  Unforeseen events often force you to revisit the chronology of events, whereas logical relationships are necessary relationships that will stay true under a wider variety of circumstances.
- **Logical dependencies make always-up-to-date schedule possible**
  Because logical dependencies withstand more changes and update schedules more reliably, it may be possible to realize the ideal of always-up-to-date schedules. This will remove the delay in the management feedback loop for executives and clients.
- **Logical relationships produce the tightest possible schedule**

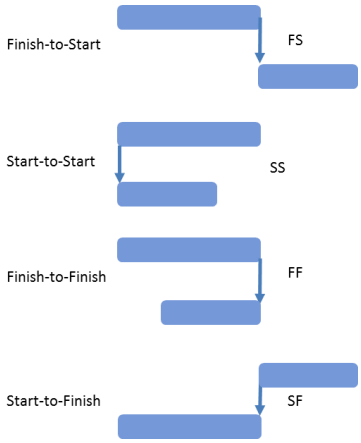
The cause-and-effect relationships will tell you the absolute minimum duration of the project and protect the sanity of the schedule. Logical relationships tell you the minimum duration, whereas chronological relationships often tell you the nice-to-have duration of the project.

Topic 3: Types of Dependencies



The most commonly used dependency type is the Finish-to-Start. This is a relationship that runs form the finish (F) of the driver to the start (S) of the driven task.

The driver task (predecessor) can be linked from its start or its finish. The driven task can be linked to its start or finish. This allows for a total of four different possibilities and four dependency types. They are characterized by the following four abbreviations; FS, SS, FF, SF as shown in the illustration.

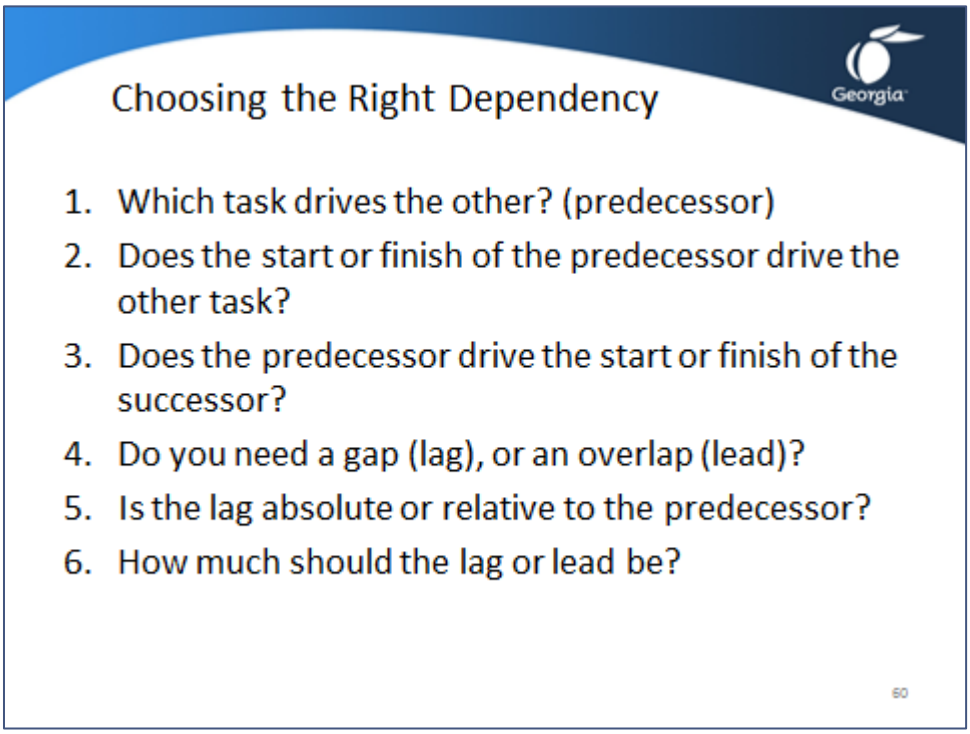


- *Finish-to-Start (FS)*:
  A Finish-to-Start dependency (without lag) causes the driven task to start when or after the driver finishes.
  A report has to be written before it can be printed. If the finish date of the writing slips, the start date of the printing should slip with it.

- *Start-to-Start (SS):*
  A Start-to-Start dependency (without lag) causes the driven task to start when or after the driver task starts.
  When you pour a concrete floor, you want it to be leveled and finished right away before it cures. There is an SS link between the tasks *pour concrete* and *level concrete*.

- *Finish-to-Finish (FF):*
  A Finish-to-Finish dependency (without lag) causes the driven task to finish when or after the driver task finishes.
  If you train people in how to use a new software application, you would like to have the software installation finished just as they return to their workstations. There is an FF link between *train users* and *install application*.
- *Start-to-Finish (SF):*
  A Start-to-Finish dependency causes the driven task to finish when or after the driver task starts.
  When the new website comes online, the old one will stop.

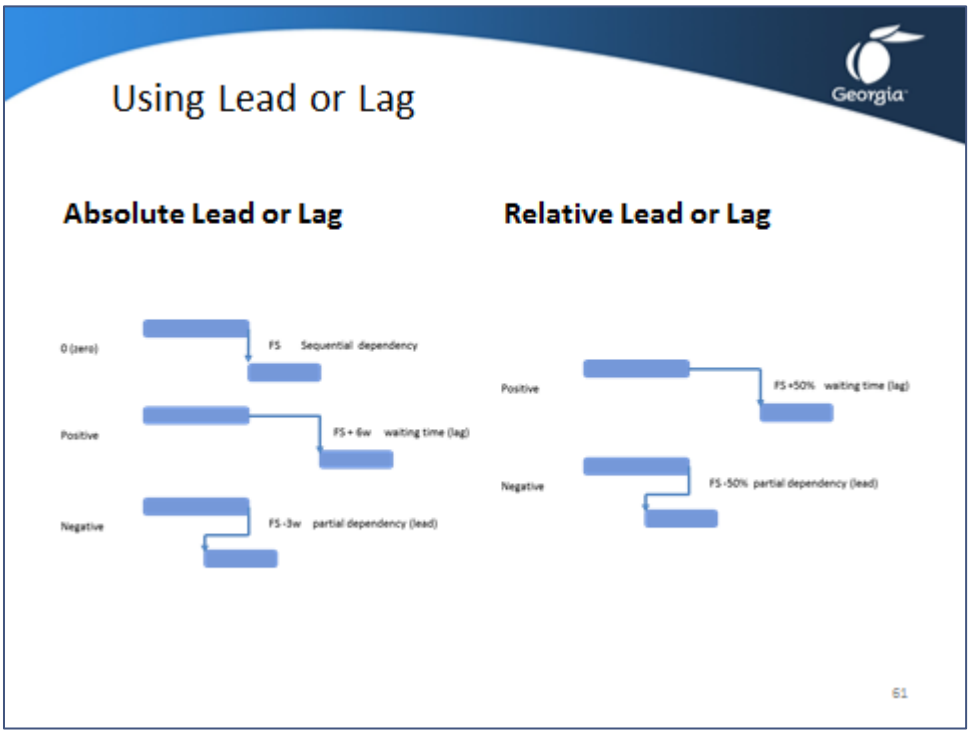
Topic 3: Types of Dependencies – Choosing the Right Type



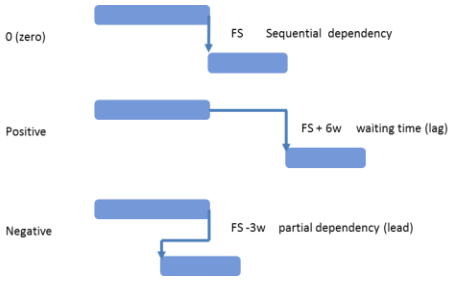
Ask yourself the following six questions to assist you identify the right dependency:

1. *Which task drives the other?* or *What do you need in order to do this task?*
   Use this question to determine which task is the predecessor.
2. *Does the start or the finish of the predecessor drive the other task?*
   This question helps to find if you need an S (Start) or an F (Finish) dependency.
3. *Does the predecessor drive the start or the finish of the successor?*
   Once you know the answer to this question, you know the type of dependency you need: SS, FS, SF, or FF.
4. *Do you need a gap (positive lag), or an overlap (negative lag or lead)?*
   If your answer is no, you are ready with this dependency. We will discuss lags in the next lesson.
5. *Is the lag an absolute number of days or weeks, or is the lag relative to the duration of the predecessor (driver)?*
   a. If absolute: *Should it be in business days or elapsed days (calendar days)?*
   b. If relative: enter a percentage in the **Lag** field, like *+50%* or *-30%* (including the percentage sign).
6. *How much should the lag or lead be?*
   After answering this question you should know the complete dependency definition, *FS+50%, SS+3d*, or *FF+2ed*.

Topic 4: Using Lead or Lag

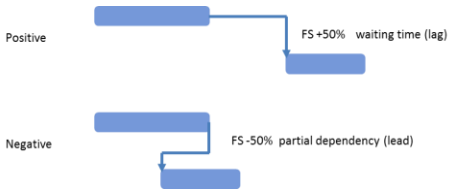


Absolute Lead or Lag Time in Business Days



When you want the driven task (Successor) to wait some time before it starts, you can add a lag to a dependency. The lag is expressed in business days or elapsed days. Lag time acts as if the dependency has duration. A lag can also be negative, which is called a lead, since the start of the successor will be earlier than the finish of the predecessor. In such a partial dependency, the driven task (successor) is dependent upon the partial completion of its predecessor.

Relative Lead or Lag Time



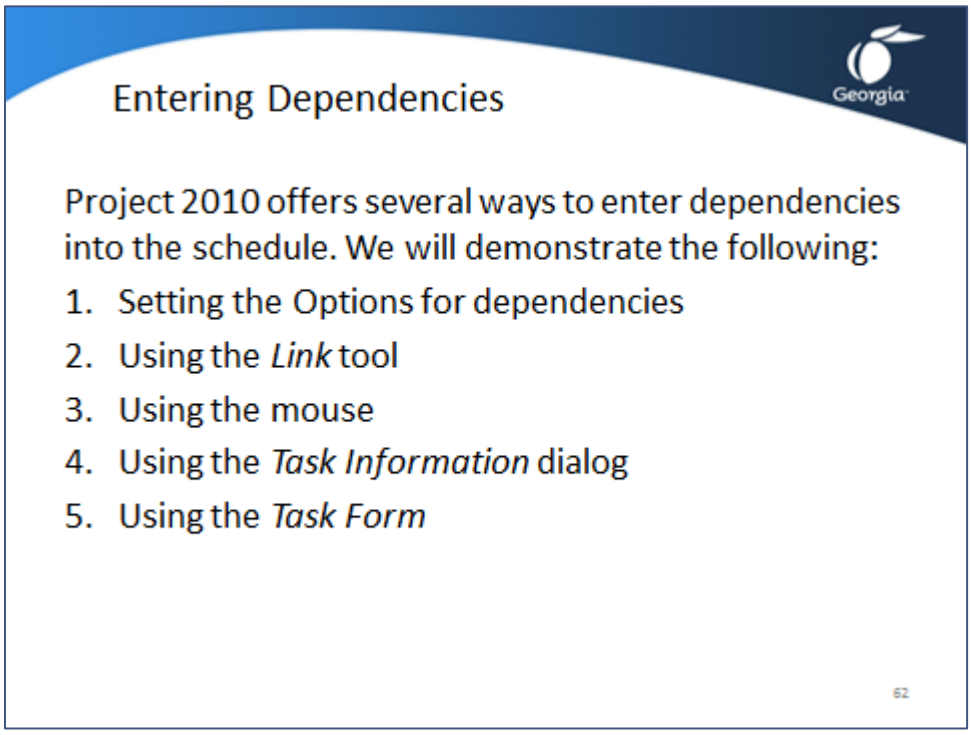
You can also express the amount of lead or lag as a percentage of the duration of the driver task (predecessor), as seen in the illustration. The driven task bar (successor) takes a relative position to the driver task bar (predecessor).

Examples:

- There are two tasks *write report* and *edit report*. After writing the first half of the report, we want to send it to the editor. We need an *FS-50%* dependency between *write report* and *edit report* (the 2nd example in the illustration).

- The *electrical design* starts when the *civil engineering design* is 60% complete: *SS+60%* or *FS-40%*. The lag is relative to the duration of its driver task.

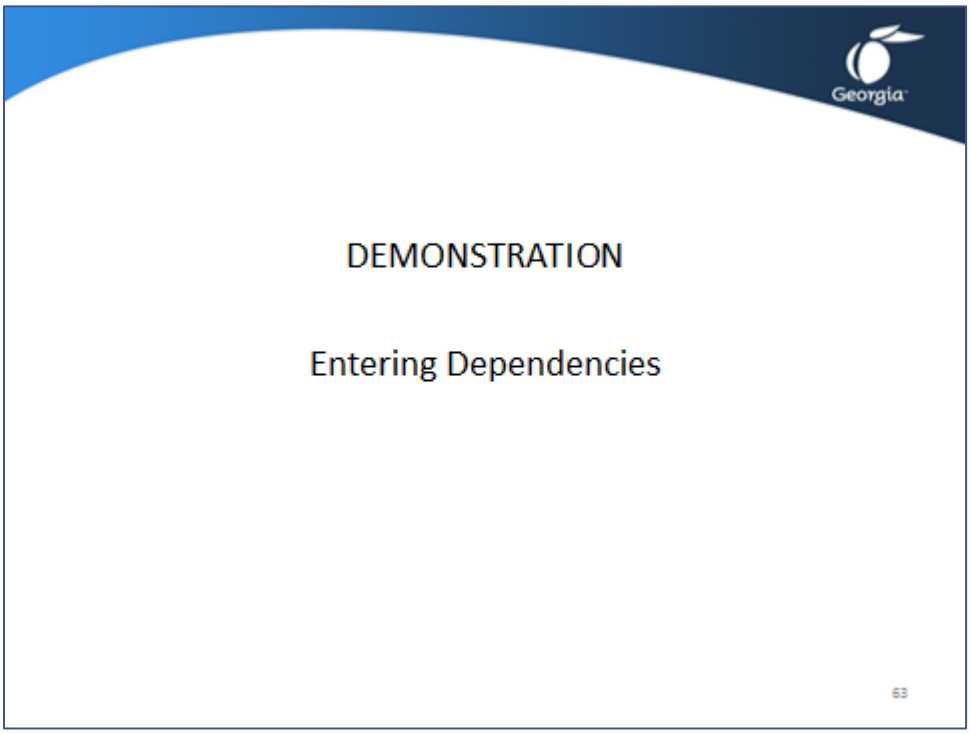
Topic 5: Entering Dependencies in the Gantt View



Project 2010 offers a variety of ways to enter dependencies into the schedule. They can be entered either in the Gantt Chart or the Network Diagram. In this course we will discuss:

- Using the *Link tool*
- Using the mouse
- Using the *Task Information* dialog
- Using the *Task Form*

Topic 5: Entering Dependencies – Setting the Options



Open the demonstration file **Demo Lesson 5 Entering Dependencies**.

Click ribbon File, Options and click on the tab indicated in the table below where you want to change settings:

Tab	Option
Schedule	**Autolink inserted or moved tasks** should be on. This allows MS Project to set or break dependencies inside a waterfall chain of Finish-to-Start dependencies.
	If **Update Manually Scheduled tasks when editing links** is selected, MS Project will reschedule **Manually Scheduled** tasks. Three reasons linking **Manually Scheduled** tasks does not make sense: 1. A default duration of *1 day?* is entered for the task that does not yet have a duration. This removes the flexibility of **Manually Scheduled** tasks. 2. Links between **Manually Scheduled** tasks are *static dependencies* and only work when they are created. If changes happen the links no longer work. 3. If you do not switch to Auto Scheduled tasks you will receive many warnings that beg your attention.

How to Switch Tasks to Auto Scheduled

First, turn off an option called **Keep task on nearest working day when changing to Automatically Scheduled mode** (ribbon **File**, **Options**, tab **Schedule**, section **Scheduling options for this project**).

To switch all tasks:

1. Click on any column heading.
2. Click ribbon Task and click 

.

To switch selected or multiple tasks:

1. To select adjacent tasks, drag over them. To select multiple, click on the first task and hold down the **Ctrl** key while you click on or drag over the other tasks.
2. Right-click in the selected area and select **Auto Schedule**.

Topic 5: Entering Dependencies – Using the Link Tool

With the link tool you can create a chain of Finish-to-Start dependencies between many tasks with one click.

To Set a Chain of Dependencies

1. Select adjacent tasks by dragging over their task names starting with the driver task (predecessor). You can select more than just two tasks.
   OR
   Select the driver (predecessor) first, hold down **Ctrl** and click on the driven (successor) task. You can click on the task name in the spreadsheet or on its task bar in the timescale. You can click as many tasks as you want to link**.**

   NOTE: select the tasks in the order in which you want the tasks to be linked (from driver to driven task), even if the driven task is higher in the list.

2. Let go of the **Ctrl** key when you selected them all.
3. Click ribbon **Task** and find its section **Schedule** and click 
   OR
   Hold down **Ctrl** and press **F2**
4. The tasks are now Finish-to-Start dependent.

NOTE: This method allows you to set *Finish-to-Start* dependencies only.

To Delete a Chain of Dependencies between Tasks

1. If the tasks are adjacent, select all predecessors and successors by dragging over their task names
   OR
   If the tasks are not adjacent, select one task first and then hold down **Ctrl** and click on the other task involved in the link. You can click on the other task name or on the task bar, and you can click on more than two tasks that you want unlinked.
2. Click ribbon **Task** and find its section **Schedule** and click 
   OR
   Hold down **Ctrl + Shift** and press **F2**
3. Only the dependencies that ran between the selected tasks are now removed.

NOTE: This method allows you to set *Finish-to-Start* dependencies only.

Topic 5: Entering Dependencies – Using the Mouse

This method is useful if you want to create parallel paths.

To Draw Dependencies

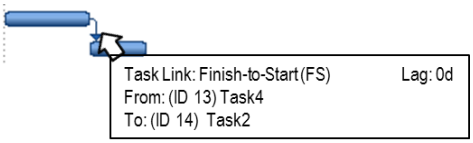
1. Point to the center of the driver task bar (predecessor); make sure you see a four-headed arrow mouse pointer . (near the front of the task bar you will see another mouse pointer: and near the back: .)
2. Click and hold down the primary mouse button and drag vertically toward the successor task bar making sure the mouse pointer now looks like .
3. Release the mouse button inside the task bar of the successor. A dependency is set and shows up as an arrow.

NOTE: This method allows you to set *Finish-to-Start* dependencies only.

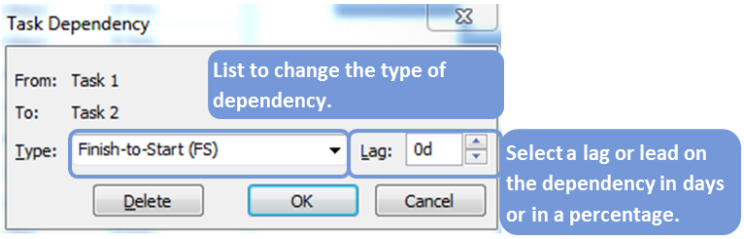
To Edit or Delete the Dependency

1. Point the tip of the arrow mouse pointer precisely to the dependency arrow you want to change, as in this screenshot:

2. Dependency arrows can overlap each other, so wait for the feedback window to pop up to confirm which dependency you are on.



3. If you have the proper dependency arrow selected, double-click and the Task Dependency dialog appears:

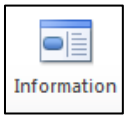


4. Select the type of dependency using the list Type and enter a positive lag or a negative lag (lead) time. You can also enter a percentage in the Lag field. The percentage will be taken from the duration of the predecessor task and treated as lag time. Click OK
   OR
   You can also click Delete to get rid of the dependency.

Topic 5: Entering Dependencies – Using the Task Information Dialog

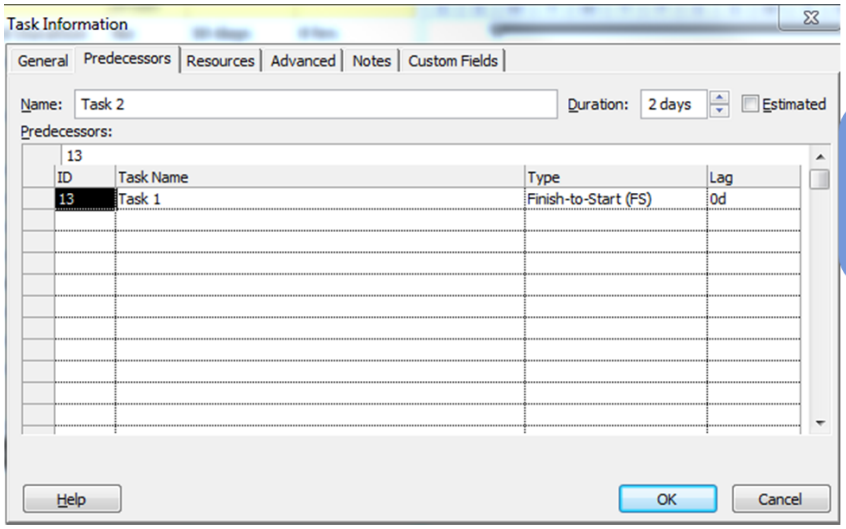
This method may be best if the predecessor and successor are listed far apart.

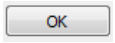
1. Double-click on the successor task **OR**

   Select the successor task and click 

   on the **Task** ribbon, or hold down **Ctrl** and press **F2** – the **Task Information** dialog appears.

2. Click the **Predecessor** tab, the dialog should now look like:



3. Click in the **Task Name** field in an empty row and select the predecessor task name from the list that appears.
   
   OR
   Enter the ID number of the predecessor in the **ID** field.
4. Select the type of dependency from the list in the **Type** field.
5. Enter a (negative or positive) lag in the **Lag** field.
6. Click 

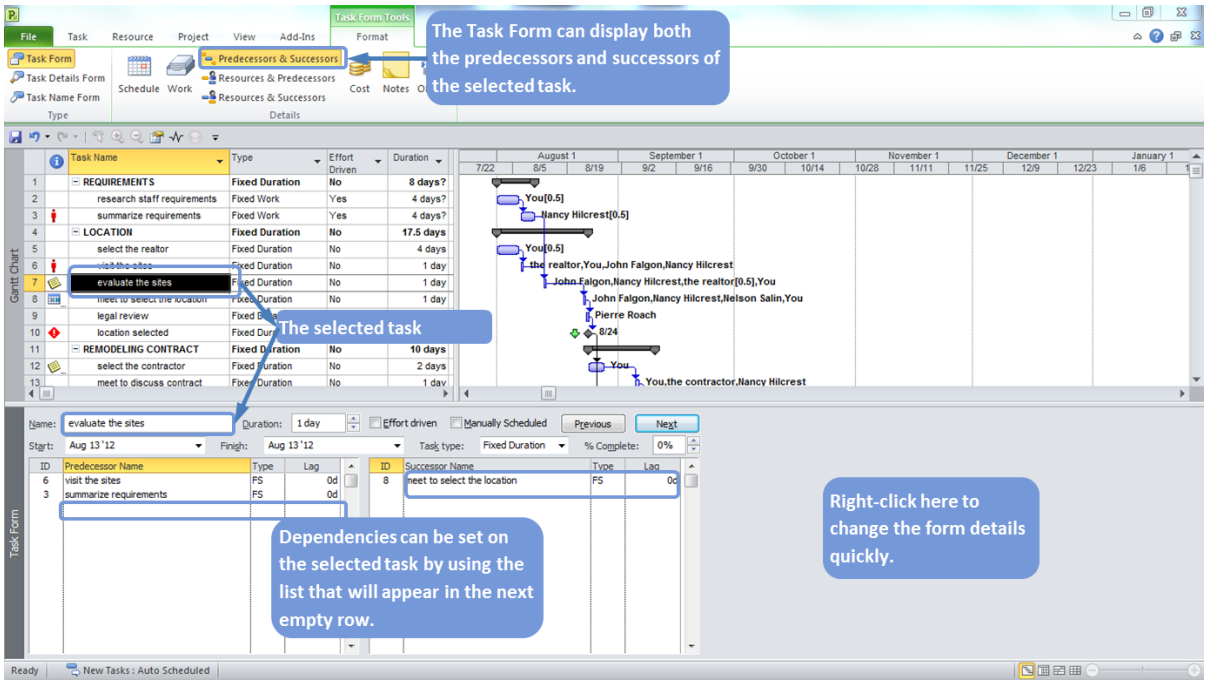
   and the dependencies are entered into the schedule.

Topic 5: Entering Dependencies – Using the Task Form

This method allows you to set multiple predecessors and successors on one task and to set dependencies when tasks are listed far apart..

1. In the Gantt Chart, display the Task Form:
   Right-click in the timescale (not on a task bar) and select **Show Split** from the popup menu
   OR
   Click ribbon **View** and select Details .

2. The **Task Form** appears by default in the bottom of the screen. Click on the **Task Form** to make this view active.
3. Click ribbon **Format** and click Predecessors & Successors to view all dependencies of the selected task. Your screen should now look like:

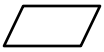
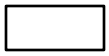
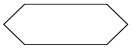


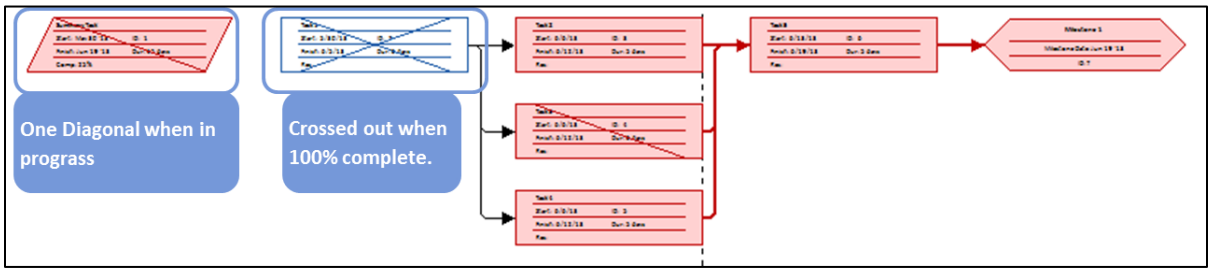
4. Click the task link in the top of the Gantt Chart view.
5. On the bottom Task Form view, click in the field **Predecessor Name** or **Successor Name** in an empty row and use the list that appears to create the dependency
   OR
   Type the ID number of the predecessor or successor task in the **ID** field.
6. Set the type of dependency in the **Type** field and add a positive *lag* or negative lag (*lead*) in the **Lag** field, if necessary.
7. Click OK on the Task Form – the data are entered into the schedule only after this button is clicked.

Topic 6: The Network Diagram

To apply the view, click ribbon **View**, button **Network Diagram**. The Network Diagram can display an overview of all the dependencies you have set; the dependencies are depicted as arrows in this view.

By default, the Network Diagram displays the types of tasks in differently shaped nodes:

- Summary tasks in a parallelogram 
- Detail tasks in a rectangle 
- Milestones in a hexagon 



The default formatting in the Network Diagram is as follows:

- *Critical tasks* have a red fill and red border
- Noncritical *Auto Scheduled* tasks have a white fill and blue border
- Noncritical *Manually Scheduled* tasks have a light blue fill and dark blue border

The color and shape of the nodes can be changed by clicking ribbon **Format**, button **Box Styles**.

Exercise 5.1: Entering Dependencies for the Relocation Project

Instructions:
The goal of this exercise is to be able to enter a complete network of cause-and-effect dependencies into the schedule.

Continue to work with your file *Relocation.mpp* or open *Exercise4.mpp*.

Enter the following dependencies:

1. Finishing the task *research staff requirements* allows the task *summarize requirements* to start.
2. Finishing the task *summarize requirements* allows the task *evaluate the site* to start.
3. The detail tasks of the deliverable *LOCATION* are all Finish-to-Start dependent upon each other.
4. Accomplishing the milestone *location selected*, allows you to start the task *select the contractor* and the task *select mover*.
5. The detail tasks of the deliverable *REMODELING CONTRACT* are all Finish-to-Start dependent upon each other. The dependency between *select contractor* and *meet to discuss contract* has a lag of 5 days; it will take a time frame of 5 days to get the participants together to meet.
6. Accomplishing the milestone *contractor contracted* allows the task *relocate walls* to start.
7. The tasks *relocate walls* through *install cabinetry* of the deliverable *REMODELED LOCATION* are all Finish-to-Start dependent upon each other.
8. In the deliverable *REMODELED LOCATION* the tasks *install cabinetry* and *install LAN* can take place concurrently after the paint dries. *Drying of paint* is the predecessor for both tasks.
9. Accomplishing both tasks *install cabinetry* and *install LAN* can start the task *lay carpet*.
10. Completing the task *lay carpet* achieves the milestone *facility remodeled*.
11. Accomplishing the milestone *facility remodeled* allows the task *pack* to start.
12. The detail tasks of the deliverable *MOVE* are all Finish-to-Start dependent upon each other.
13. Compare your file with the solution file *Exercise5.mpp*.
14. Save your file.

Lesson 5 Checklist: Best Practices for Entering Dependencies

- Have you turned the **Task Mode** of all tasks to Auto Scheduled?
- Is the network of dependencies complete?
- Is the network of dependencies correct?
- Is the network logic simple enough?
- Does the resulting high-level schedule make sense?
- Have you turned off **Autolink** after checking the network?

Notes

Lesson 6: Entering Deadlines, Constraint Dates, and Calendars

Topic 1: Deadlines versus Constraint Dates

Topic 2: Entering and Managing Deadlines

Topic 3: Types of Constraints

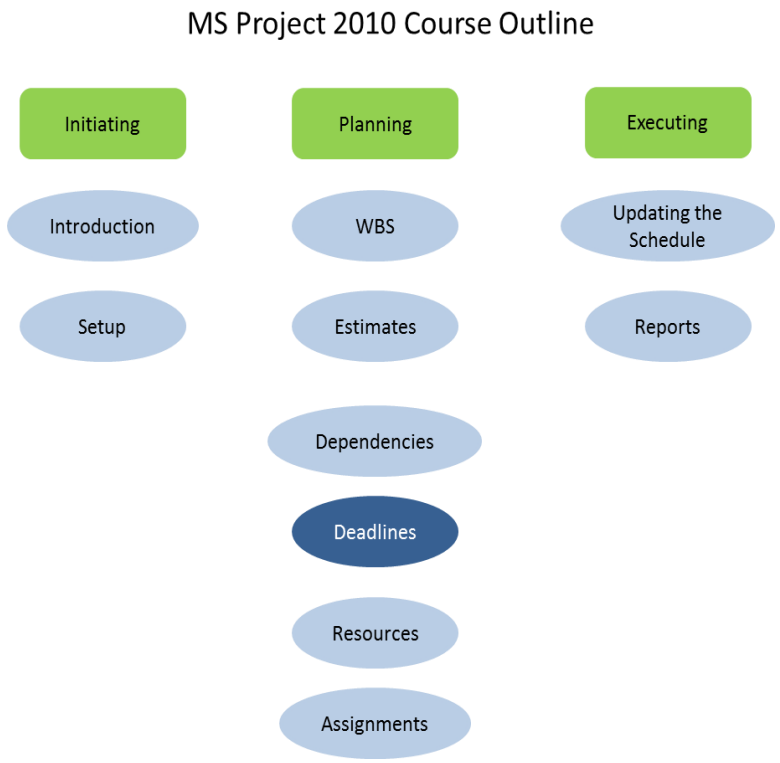
Topic 4: Entering and Managing Constraint Dates

Student Learning Objectives

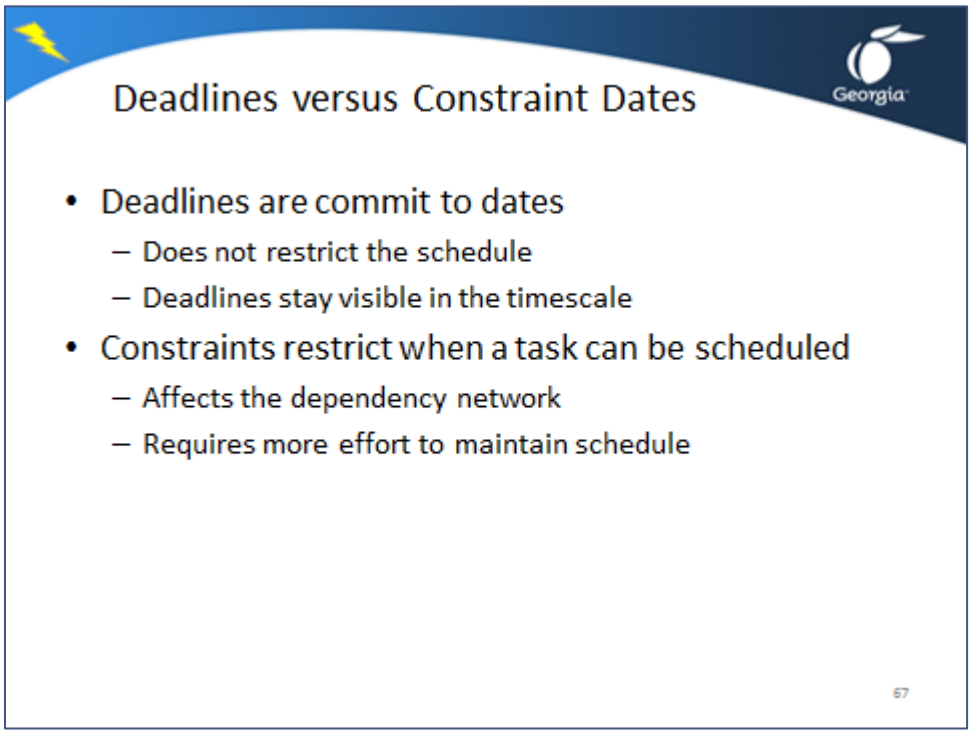
After completing this lesson you should be able to

- Understand the difference between deadlines and constraints
- Understand which situations to use deadlines or constraints
- Understand how to enter constraint and deadline dates into the project schedule

Approximate Presentation time: 1 hour



Topic 1: Deadlines versus Constraint Dates



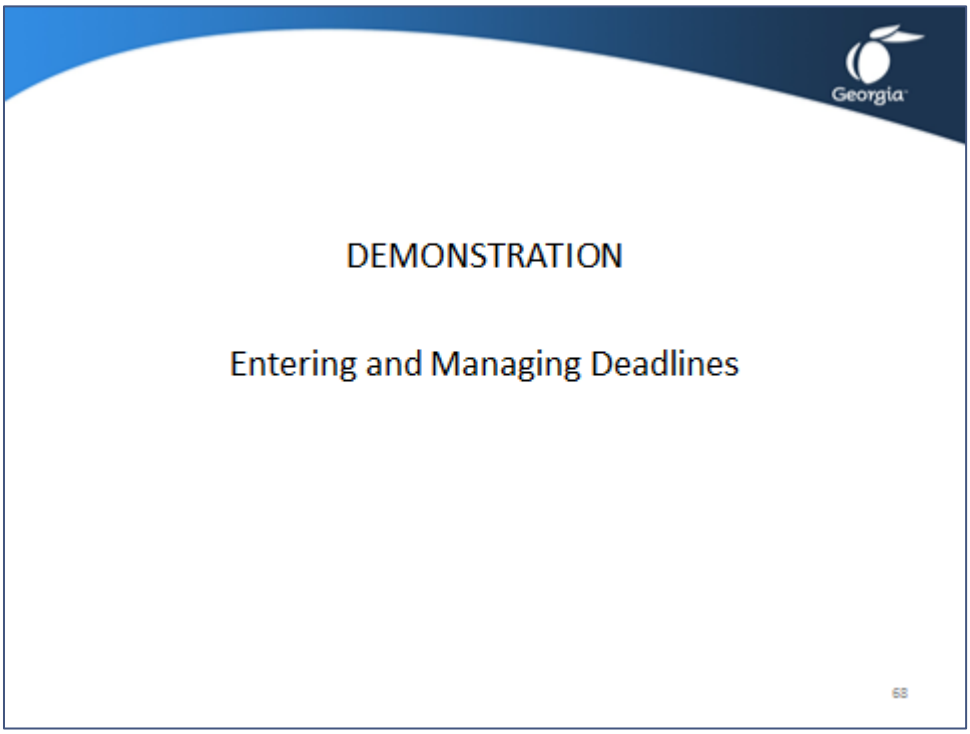
A deadline is a date you commit to that does not restrict the scheduling of a task.

A constraint is a date that restricts when MS Project can schedule a task.

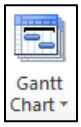
Date constraints affect the network of dependencies. The more constraints you create, the less freely your network will flow back and forth when you enter changes. Therefore, the more constraints you have in your schedule, the more effort you will spend revising (constraint) dates to keep your schedule valid.

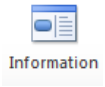
Deadlines, on the other hand, do not restrict the scheduling of tasks. Deadline dates stay visible in the timescale as down-facing green arrows . When you miss a deadline date, MS Project displays a red indicator in the indicators column.

Topic 2: Entering and Managing Deadlines

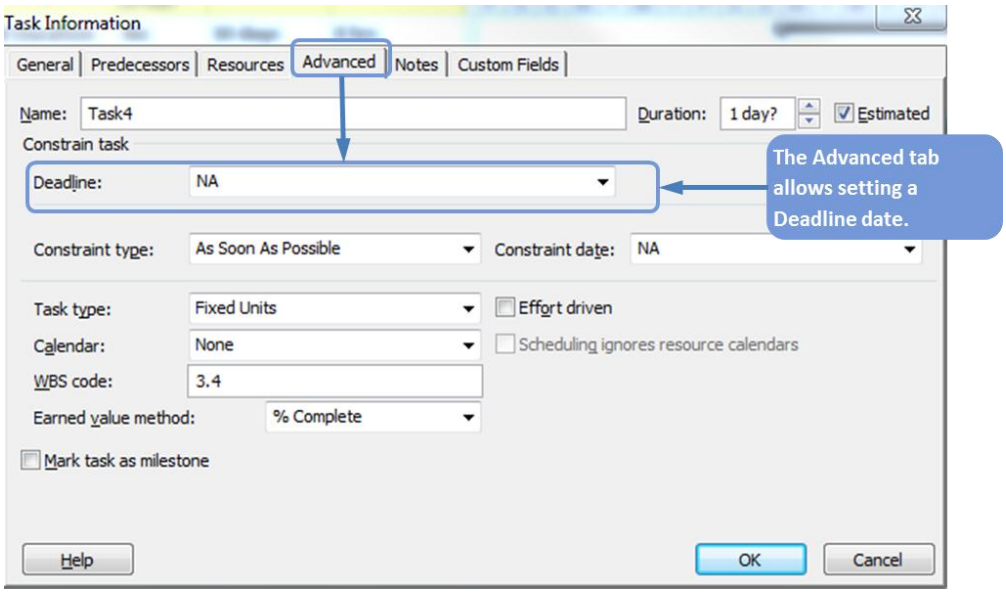


Entering Deadlines

1. Open the demonstration file **Demo Lesson 6 Entering Constraints**.
2. Click ribbon **View** and find its section **Task Views**, click the top part of 

.
3. Double-click on the task, click the ribbon **Task** and click 

.
4. Click the **Advanced** tab; the dialog should now look like:



5. Enter the deadline date in the **Deadline** field or use the pull-down calendar to click on a date.

6. Click OK and you will now see and arrow in the timescale that represents the deadline date you entered. You can move deadline dates by simply dragging the green arrow in the timescale to a new date. You can start dragging as soon as you see the four-arrow mouse pointer .

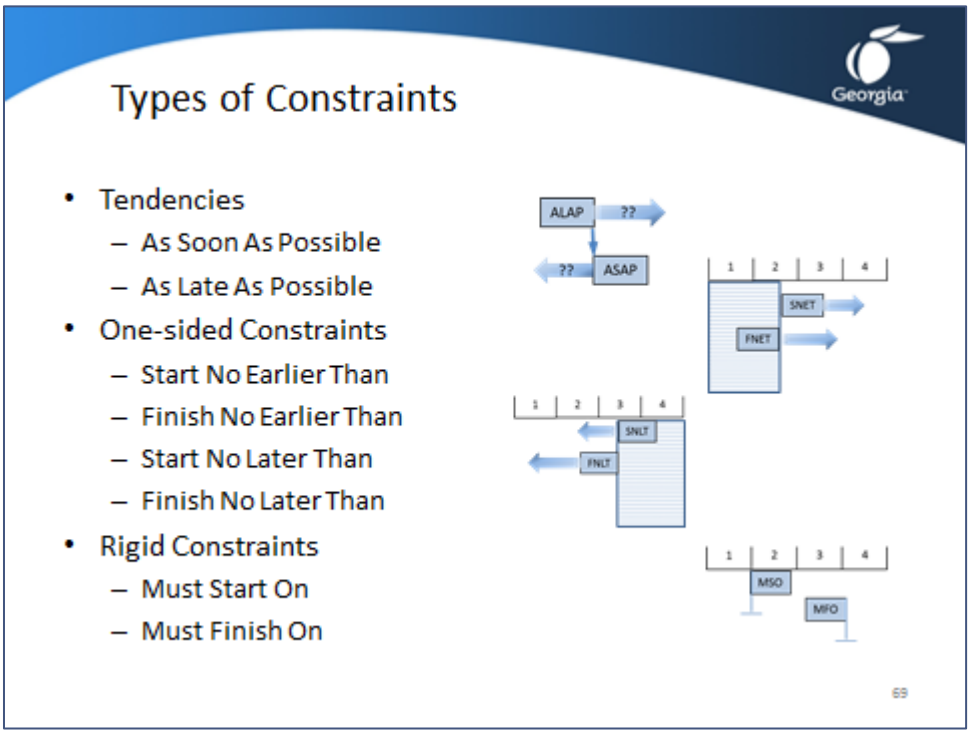
NOTE: If you have to be done before November 1, you have to enter October 31 as the deadline date. The deadline time will be at the end of the day by default unless you enter a time as well. If you enter *November 1* as the deadline date, the tasks will be done by 5:00 PM on November 1. You could add the time to the deadline date by entering *November 1, 8 AM,* for example.

Managing Deadlines

You will not get automatic warning dialog from MS Project is deadlines are not met. What you do get is a red exclamation icon in the indicators column .

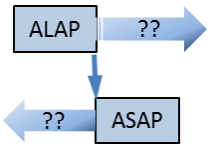
Also, if you use the list of filters on the View ribbon and apply the filter Tasks with Deadlines, you can quickly display all tasks with deadline dates and see which deadlines are slipping.

Topic 3: Types of Constraints



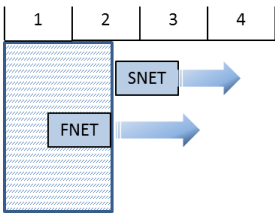
The eight types of constraints can be categorized as tendencies, one-sided constraints, or rigid constraints.

Tendencies:



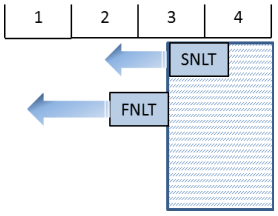
- **As Soon As Possible (ASAP)**; default under forward scheduling). MS Project will pull task bars in the timescale as far to the left as the project start date and the network of predecessors will allow.
- **As Late As Possible (ALAP**); default under backward scheduling). MS Project will push task bars in the timescale as far to the right as the project finish date and the network of successors will allow.

One-sided constraints:



- **Start No Earlier Than (SNET)**; The start date cannot go to the left of the No Earlier Than date. An Example of a SNET constraint is when supplies will not be delivered until a certain date. You can start the activity for which you need the supplies no earlier than the delivery date.
- **Finish No Earlier Than (FNET)**; The finish date cannot go to the left of the No Earlier Than date. An example of a FNET constraint is when you need an approval for a deliverable. The approval can take place at the next board meeting in 1 week. A FNET constraint would be entered.

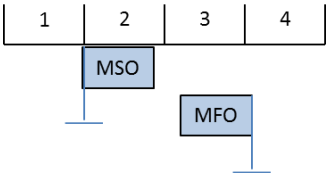
- **Start No Later Than (SNLT)**; The start date cannot go to the right of the No Later Than date. An example of SNLT constraint is that you may not want to start asphalting a road after November 1st due to weather conditions.



- **Finish No Later Than (FNLT)**; The finish date cannot go to the right of the No Later Than date. An example of a FNLT constraint is when you commit to deliver a report no later than March 15th, and this date is a do-or-die date.

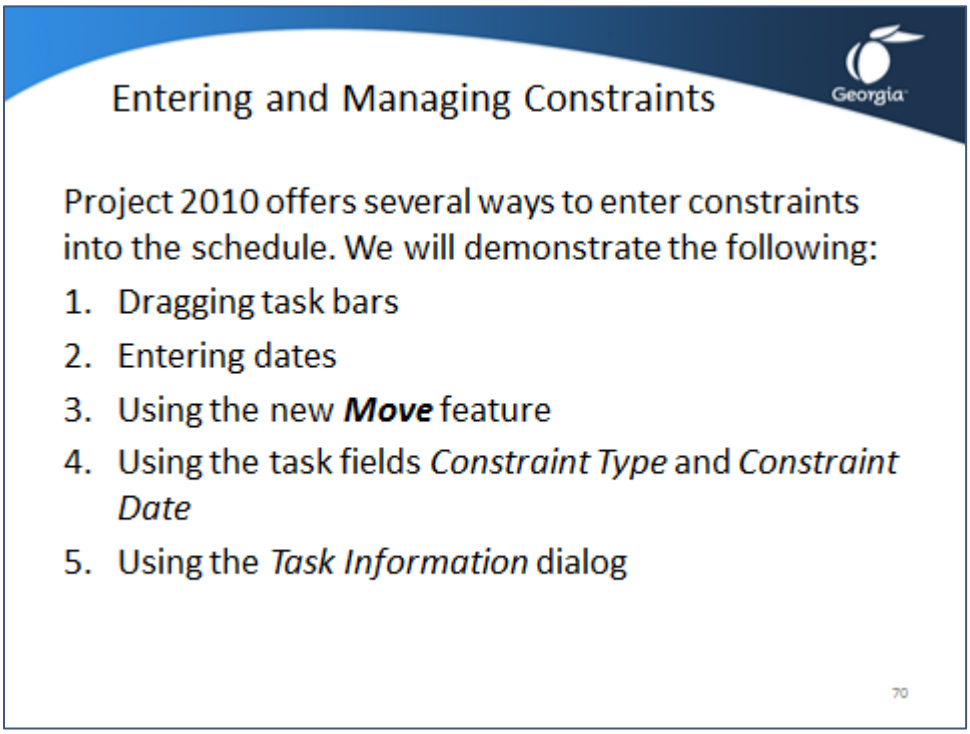
Rigid constraints:

- **Must Start On (MSO)**; The start date is locked and allows no flexibility. An example of a MSO constraint is holding an important meeting that must start on January 9th.



- **Must Finish On (MFO)**; The finish date is locked and allows on flexibility. An example of a MFO constraint is when you have a contractual date in which you must move out of an office space or pay a steep penalty.

Topic 4: Entering and Managing Constraint Dates



Before working with constraint dates make sure the proper Options have been set.

Click ribbon **File**, button **Options** , tab **Schedule**, section **Scheduling Options for this project**, turn on **Tasks will always honor their constraint dates**.

NOTE: If you have to be done before November 1, you have to enter October 31 as the constraint date. By default the constraint time will be at the end of the day on the date you enter. If you enter *November 1* as the constraint date, the task will be done by 5:00 PM on November 1. You could add a time with the date.

The following demonstration will cover the various ways a constraint date can be entered.

- Dragging task bars
- Entering dates
- Using the new **Move** feature
- Using the task fields *Constraint Type* and *Constraint Date*
- Using the **Task Information** dialog

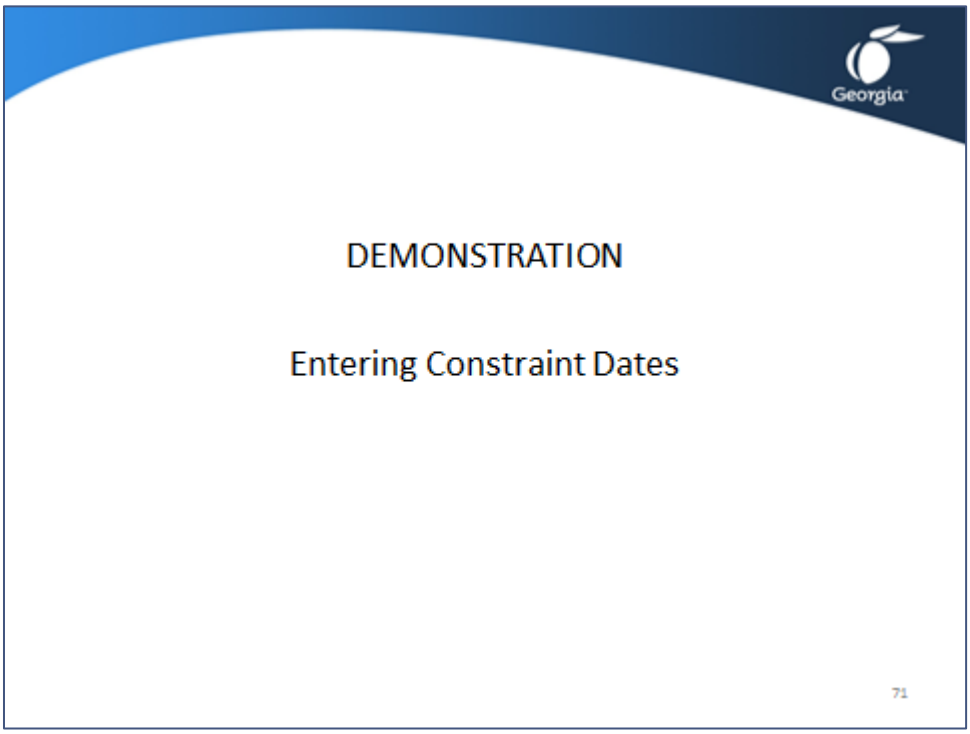
In Which Situations do you Need Constraints?

For Auto Scheduled tasks it is recommended constraints be used for the following situations:

- *External Dependencies*: enter is as an extra milestone that is held in place by a *Start No Earlier Than (SNET)* constraint.

- *Group activities*: Meetings, presentations, training or, in general, tasks that involve a group of people. A *Must Start On* or *Must Finish On* constraint should be used for these activities.
- *Public events*: Seminars, conferences, performances and other events to which the public is invited. These may be one or more days in duration. These dates are fixed and do not change. A *Must Start On* or *Must Finish On* constraint should be used.

Topic 4: Entering Constraint Dates - Demonstration



Setting Constraints by Dragging Task Bars Horizontally

Open the demonstration file **Demo Lesson 6 Entering Constraints.**

Point to the middle of the task bar; make sure you see a four-headed arrow:

1. Click and hold down to drag the bar to the right horizontally to where you want is scheduled. Make sure you see a horizontal two-headed arrow as a mouse pointer at this point:  .
2. Look at the popup window to see what the dates will be:

3. Release the mouse when the task bar is scheduled on the date you want. The Planning Wizard may prompt you :
   a. If you want to set a constraint and remove or keep the link
   b. If you want to create a link instead of a constraint.

   Answer the prompt and click **OK**.
4. The bar you dragged has a **Start No Earlier Than** constraint to keep it in its new place.

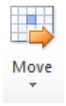
Setting Constraints by Entering Dates

In the field **Start** you can pick a date from the drop-down calendar. By default, this creates a *Start No Earlier Than (SNET)* constraint on the task. In the field **Finish**, you can pick a date from the drop-down calendar. By default, this creates a *Finish No Earlier Than* constraint on the task.

NOTE: Many people use the **Start** and **Finish** fields to schedule all their tasks. The intent is not to create a constraint but an unawareness of what MS Project is doing. Their schedules become rigid and require a lot of effort to maintain. It is not recommended to use the **Start** and **Finish** at all for data entry. You may want to remove these fields from the **Entry** table all together. Click the column heading and click the **Del** key.

Setting Constraints with the Task Move Feature

This feature is new in Project 2010. It is useful for updating schedules during project execution, but less so during planning, as it creates constraints on **Auto Scheduled** tasks.

1. Select the task to reschedule forward or back
2. Click ribbon **Task** and find its section **Tasks**. (Make sure you are not on the **Project** ribbon and the **Move Project** feature.)
3. Click the 

- a drop-down menu appears with several choices.
4. Click the choice you want. A *Start No Earlier Than* constraint is set for **Auto Scheduled** tasks.

Setting Constraints Using the Constraint Fields

This method for entering constraints is recommended.

1. Insert the field *Constraint Type* by right-clicking on the column heading before which you wish to insert it – a popup menu appears.
2. Click **Insert Column** – a new column is inserted with **[Type Column]** as its heading and a long list of fields.
3. Start typing the name of the field you need, **Constraint Type**, and the list will shorten to display only some items.
4. Click **Constraint Type** – the column will now be inserted.
5. Repeat these steps to insert the field **Constraint Date** as well.
6. You can now enter any type of constraint in the Gantt spreadsheet by electing the type from the list in the **Constraint Type** and picking the date from the drop-down calendar in **Constraint Date**.

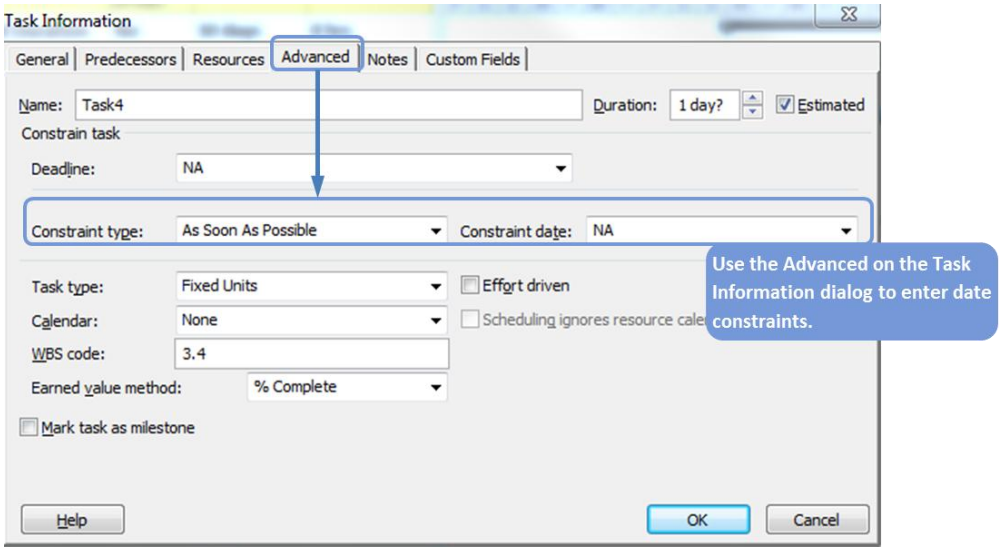
Setting Constraints Using the Task Information Dialog

This method for entering constraints is recommended.

1. Double-click on the task in the spreadsheet pane
   OR

   Select the task. Click 

on the **Task** ribbon in the **Properties** section.
2. The **Task Information** dialog appears. Click the **Advanced** tab; the dialog should now look like:



3. Select the type from the **Constraint Type** pull-down list and select a date from the **Constraint Date** drop-down calendar.
4. Click **OK** – the constraint is now entered into the schedule.

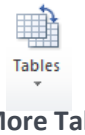
Removing Constraints

You can remove constraints one-by-one or quickly by using the fill-down feature. **Make sure you first create the dependencies that will replace the constraints dates**.

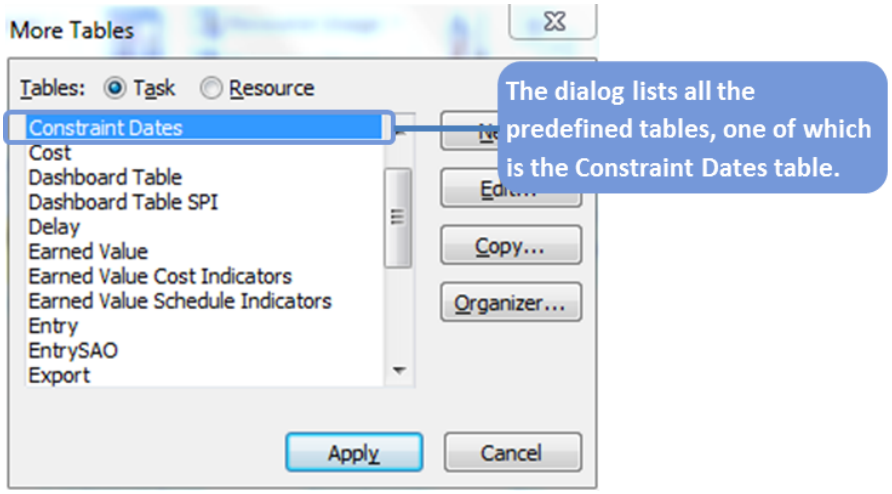
1. To remove all constraints, click on a column heading in the Gantt Chart
   OR
   To remove constraints on certain tasks, select the first one and hold down **Ctrl** while clicking on the rest of them.
2. Click 

on the **Task** ribbon - the **Multiple Task Information** dialog appears.
3. Click tab **Advanced** and in the list **Constraint Type**, select the right constraint type: **As Soon As Possible** under *forward scheduling* or **As Late As Possible** under *backward scheduling*.
4. Click **OK**.

To Check All the Scheduling Constraints

1. In the Gantt Chart click ribbon **View** and find its section **Data**.
2. Click 

and select from the drop-down menu **More Tables**.
3. The **More Tables** dialog appears.



4. Select the **Constraint Dates** table in the list.
5. Click **Apply**. You can now see the fields **Constraint Type** and **Constraint Dates** to check all constraints on the tasks.
6. You can apply a filter that displays all the tasks that have a constraint date. Click the **View** ribbon and click the **Filter** list, then **More Filters** and select the filter called **Tasks with Fixed Dates**. Click **Apply** and you will only see tasks with a constraint.

Exercise 6.1: Entering Deadlines and Constraints for the Relocation Project

Instructions:
The goal of this exercise is to be able to enter deadlines and constraints into the schedule.

Continue to work with your file *Relocation.mpp* or open *Exercise 5.mpp*.

1. Set deadlines on the following milestones by double-clicking on the task to display the **Task Information** dialog and clicking the tab **Advanced**. Note that these deadlines will be missed and the warning icon appears in the indicator column.

ID	Milestone	Deadline Date
10	location selected	August 20, 2012
16	contractor contracted	August 31, 2012
25	facility remodeled	October 26, 2012
31	new location opened	November 1, 2012

2. The CEO, *Mr. DeBoss*, is out of the country until *August 23*, 2012; we will need a *Start No Earlier Than* constraint on task *8 meet to select the location*.
   The task *pack* should be scheduled *As Late As Possible*, otherwise the equipment may be packed days before the actual move takes place over the weekend. You want the employees to be packed as late as possible on the Friday before the weekend. Enter the following constraints by double-clicking on the task to display the **Task Information** dialog and clicking the tab **Advanced**:

ID	Task	Constraint
8	meet to select the location	Start No Earlier Than August 23, 2012
28	pack	As Late As Possible

3. Notice that the AS Late As Possible constraint does not display an icon in the indicators column.
4. Compare your file with the solution *Exercise 6.mpp*.
5. Save your file.

Lesson 6 Checklist: Best Practices for Entering Deadlines, Constraints, and Calendars

- Is the project deadline date captured in the schedule?
  The deadline or constraint date for this should be set on the project finish milestone. A constraint date should only be used if the project target finish date is a very hard date.
- Are deadlines used to capture target dates on milestones that are promised to clients? Are deadlines used to capture agreed upon dates?
- Does the schedule have as few constraint dates as possible?

Notes

LESSON 7: ENTERING RESOURCES

Topic 1: What is a Resource?

Topic 2: Entering and Managing Resources

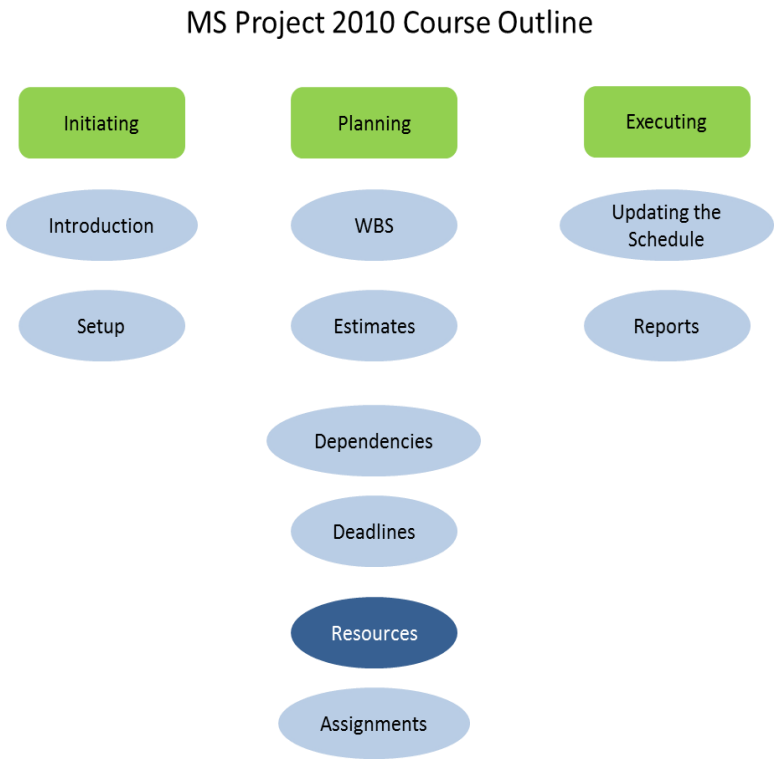
Topic 3: Editing the Resource Calendar

Student Learning Objectives

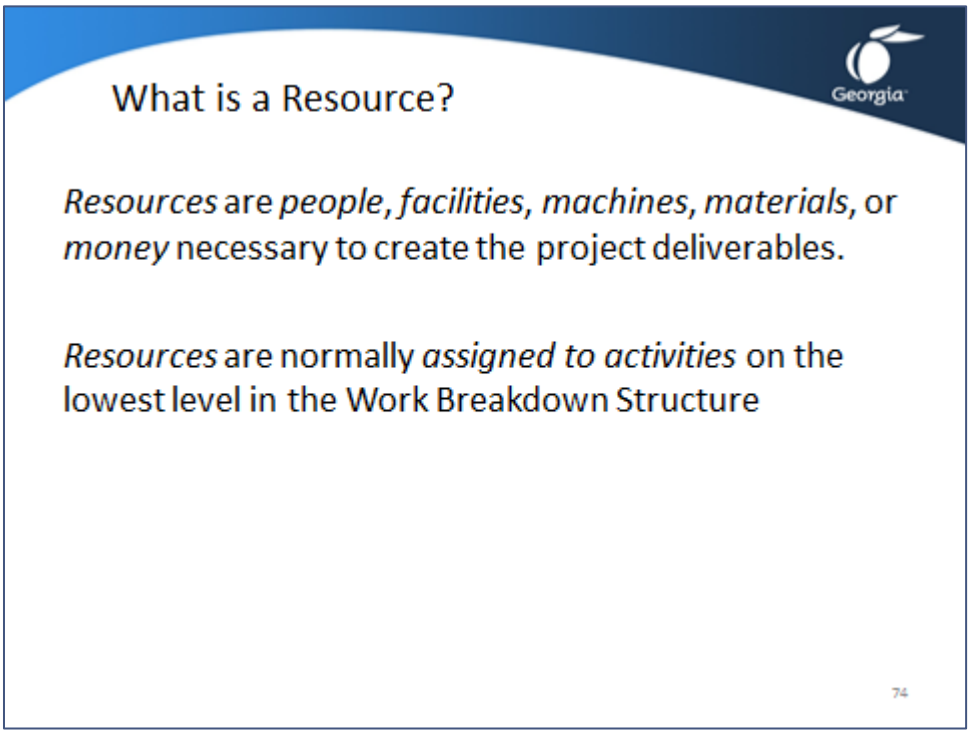
After completing this lesson you should be able to

- Understand what resources are and the difference between types of resources
- Understand to enter resources into the schedule
- Understand how to create a resource calendar

Approximate Presentation time: 45 minutes



Topic 1: What is a Resource?



Resources are *people*, *facilities*, *machines*, *materials*, or *money* necessary to create the project deliverables.

If you add resources and *assign* them to tasks, you have created a *resource-loaded schedule*. Each activity typically needs one or more resources. If you find that an activity does not need a resource, it is recommended you remove the task and model the time lapse as a lag on a dependency instead. If you capture only discrete effort through tasks, each task bar actually represents effort by team members and would need a human resource assigned.

Apart from resources, there are also *responsible* people. A *resource* and a *responsible person* differ in that:

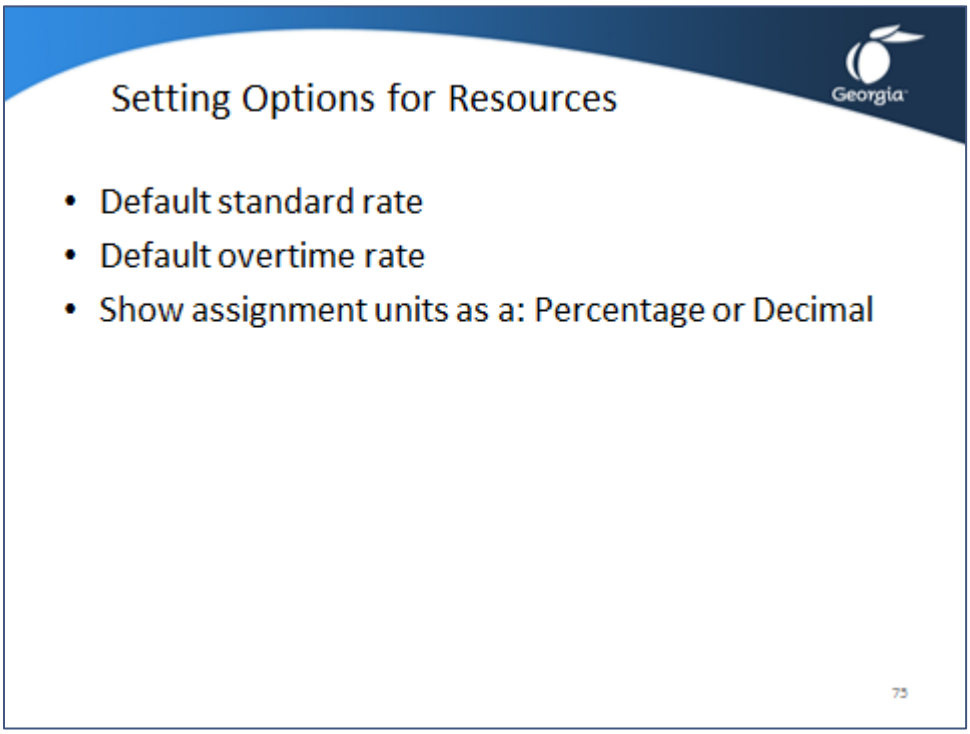
- The responsible person does not necessarily spend time and effort on project activities. People are only resources to a project if they spend effort on that project.
- Resources also include facility, machine and material resources that cannot have responsibility.
- Resources are normally assigned to activities on the lowest level in the Work Breakdown Structure (WBS), whereas responsibilities are normally assigned on a higher level, often the level of deliverables.

If you want to indicate responsibilities in your schedule without adding effort, you can accomplish this in one of two ways; the first is recommended:

- Assign responsibilities using an extra text field, i.e. **Text1**, rename it to *Responsible Person*.

- Assign responsibilities by assigning to milestones. Each deliverable in the WBS should have an associated milestone in your schedule. Milestones have zero duration and therefore carry no effort.

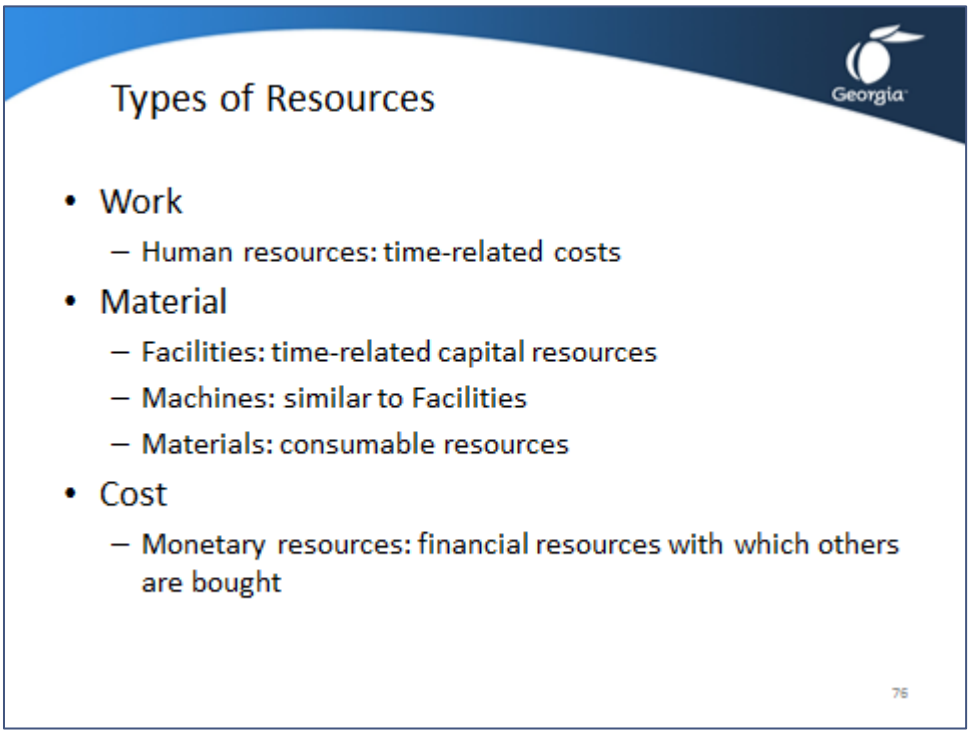
Topic 1: Setting the Resource Options



Click the ribbon **File**, **Options** and click on the tab indicated in the table below where you want to change settings.

Tab	Option
Advanced	**Section General Options for this Project:** **Default standard rate:** By entering a rate you can reduce the amount of typing you have to do. If the standard rate is set to $50/hr, you do not need to enter a rate for any resource that is $50/hr.
	Default overtime rate: By entering a rate you can reduce the amount of typing you have to do.
Schedule	Section **Schedule:** **Show assignment units as a: Percentage** or **Decimal** Units of resources can be expressed as a percentage or in decimals in the resource-related **Max Units** field (availability) and in the assignment –related field **Units** field (workload). This is a global option and applies to all your projects, existing or new. For example, you have a resource that is available half-time to your project. This option

Topic 1: Types of Resources

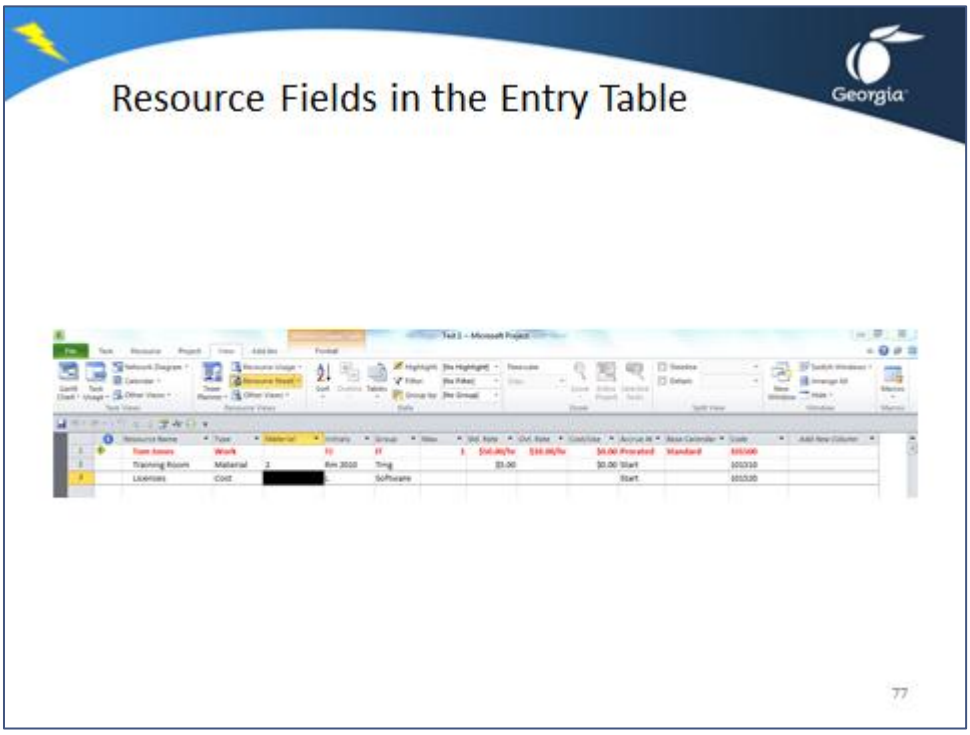


MS Project has three types of resources: **Work**, **Material**, and **Cost** resources. These are the three types given in the resource field **Type**. In practice you will come across five different types: *human*, *facility*, *machine*, *material*, and *monetary*.

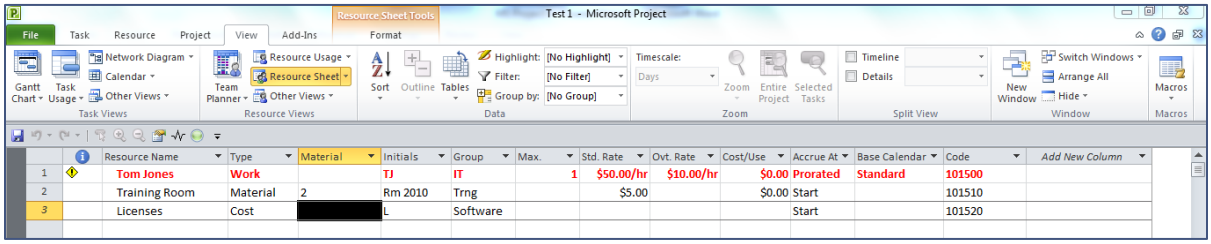
Below is a description of each of the five practical types of resources and a recommendation as to how the **Type** setting should be chosen.

- *Human resources* are people whose efforts should add up in the task *Work* field. Human effort costs money and should be given a standard rate. They typically have a time-related cost. Human resources need to be entered as **Work** resources.
- *Facilities* are capital resources and should not add to the total amount of effort of the project (**Work**). Facilities need to be entered as **Material** resources. These costs are typically time-related, like monthly rent.
- *Machines* are similar to facilities and should be entered as **Material** resources.
- *Material resources* are consumable resources. They should not add to the amount of effort (**Work**) of the project. Materials do not cost money and typically have a unit-related cost only. They should always be entered as **Material** resources.
- *Monetary resources* are financial resources with which human, facility, machine, material resources and services can be bought. The **Type** of resource called **Cost** is useful for modeling this resource. Cost resources do not add to the **Work** (effort) of the project.

Topic 1: Understanding the Resource Fields in the Entry Table



You will find the following fields in the Resource Sheet. If the field is *required*, an entry is expected. If a field is *enumerated*, a pick list will be presented once you cursor into the field. The fields discussed are in the order in which you will find them in the default resource **Entry** table:



- *Indicators*
  If a resource is over allocated, this field will show and ⚠ icon.
- *Resource Name* – required field
  This is where you enter the name of the resource.
- *Type* – required, enumerated
  The type of resource can be **Work** (default), **Material**, or **Cost**. Work resources are human resources or people. Material resources are facilities, equipment or materials. Cost resources are for capturing any other costs in your project, like hotel or car rental costs.
- *Material Label* – optional field, only for **Material** resources
  The label you enter will show up in several other views and reports. It is normally used to indicate the unit of measure of the material.
- *Initials* – optional field

Used for abbreviating the resource name.

- *Group* – optional field
  This field can be used for a variety of purposes, to capture the name of the department a resource works in.
- *Max Units (Maximum Units)* – required field, only for **Work** resources
  This is the maximum availability of the resource to your project. A resource that is available full-time to your project needs 100% in the **Max Units** field, 50% for half-time availability.
- *Std. Rate (Standard Rate)* – optional field
  Enter the standard rate for regular work in this field. For example, if you enter 10.50/h, it means the person earns $10.50 per hour.
- *Ovt. Rate (Overtime Rate)* – optional field, only for **Work** resources
  Enter the rate for overtime work in this field.
- *Cost/Use (Cost per Use* field*) (per-use-cost)* – optional field
  Enter in this field the rate that has to be paid every time the resource is used, which means on each task it is assigned. It can be an up-front fee.
- Accrue At – optional, enumerated field
  Select Start, Prorated, or End to indicate when the costs are incurred. Tab to the Accrue at field and a pull-down button appears. Select one of the following options from the list:

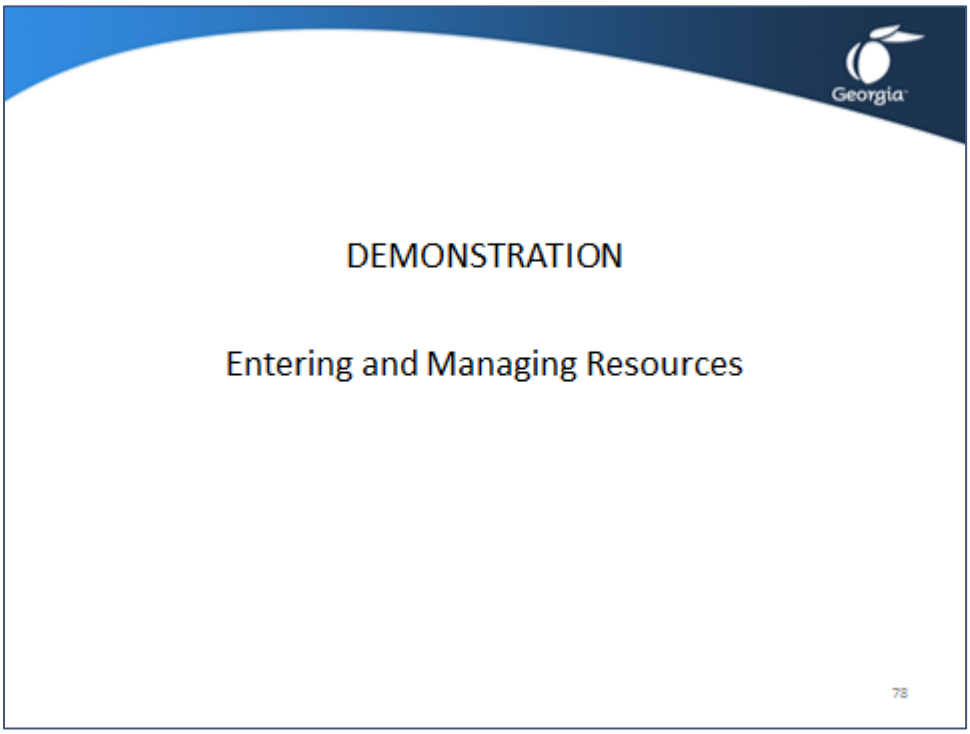
Accrue at	Incurs the Cost	Example
Start	As soon as the task starts	actors
Prorated	The cost is incurred as the task progresses; the cost goes up with the % Complete.	employees
End	As soon as the task finishes	consultants

- *Base Calendar* – optional, enumerated field
  Select a calendar from the list. The *base calendar* specifies the general working hours and working days for the resource. Material resources cannot have a base calendar.
- *Code* – optional field
  Type an alphanumeric code, such as an accounting code. This is used to charge the expenses for the resource to a particular cost account.

The following table provides an overview of editable fields displayed in the columns for each **Type** of resource displayed in the rows. (X = field is not editable).

	Editable Fields				
	Material Label	**Max Units**	**Std. Rate Ovt. Rate Cost/Use**	**Accrue at**	**Base Calendar**
Work	X	availability	all rates	select	select
Material	unit of measure	X	Std. Rate Cost/Use	select	X
Cost	X	X	X	select	X

Topic 2: Entering and Managing Resources



Entering a Human Resource (Work)

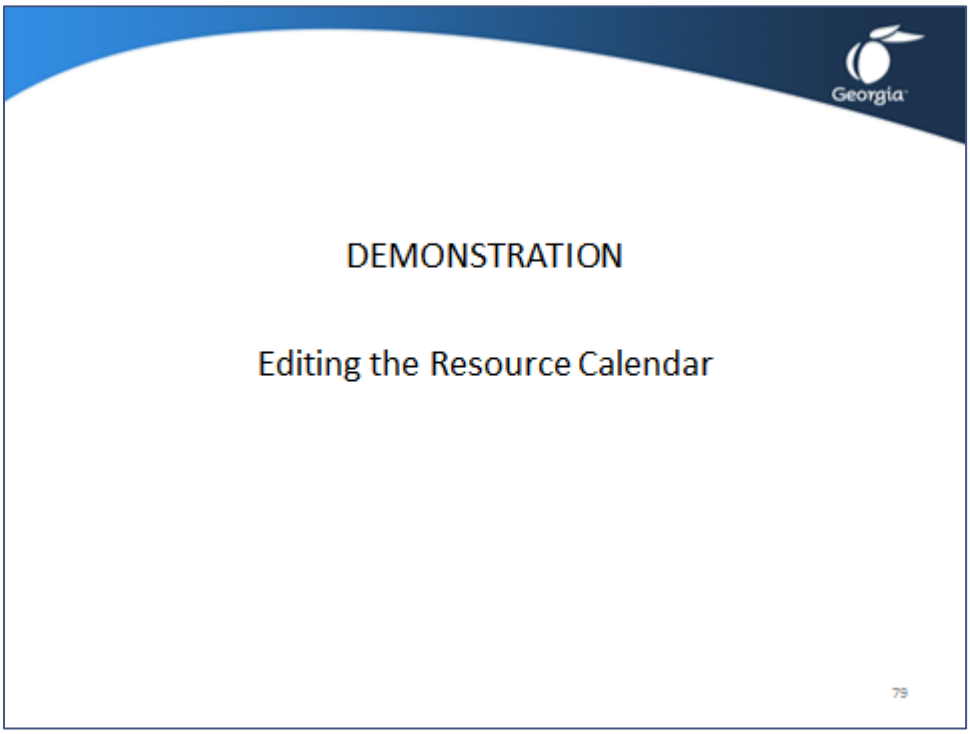
1. Open the demonstration file **Demo Lesson 7 Entering Resources**.
2. Click ribbon **View,**  - the Resource Sheet view will appear.
3. Check if the table **Entry** is active:
   - Click ribbon **View** and find its section **Data**.
   - Click the **Tables** button and click **Entry**.
4. Enter the name of the resource in the column **Resource Name** (field **Name**) and press the **Tab** button to go to the cell to the right.
5. Enter the availability in the column **Max Units**, in the **Resource Availability** profile or on the resource calendar.
6. Enter the cost rates in the **Std. Rate** column (**Standard Rate** field), **Ovt. Rate** column (**Overtime Rate** field) and **Cost/Use** column (**Cost per Use** field).
7. In the field **Accrue at** determine when the cost will be incurred by selecting **Start**, **Prorated**, or **End**.
8. Enter the **Base Calendar** field and a list button will appear. Select the appropriate base calendar for the resource from this list.
9. When you assign **Work** resources to tasks, the finish dates of the tasks will be driven by the availability of the resource. MS Project calculates the cost of using the human resource on the task using the following *formula*:

*Cost=Std.Rate * Regular Work + Ovt. Rate * Ovt. Work + Cost/Use * Assignment Units* where *Regular Work* is the number of hours designated as regular work (normally scheduled during regular working times as entered on the *Project Calendar*) and *Overtime (Ovt.) Work* is the number of hours designated as overtime work. MS Project displays this cost in the **Assign Resources** dialog for each assignment.

Entering a Material Resource

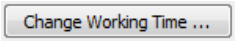
1. Enter the name of the resource in the column **Resource Name** (field **Name**); press the **Tab** key to go to the cell to the right.
2. In the field **Type** enter **Material** for facility, machine, or consumable materials.
3. Enter the unit of measure for the material resource in the column **Material Label**, for example *cubic yard* for resource *concrete*.
4. MS Project assumes that material resources are available in unlimited quantities; you do not need to fill in the field **Max Units**.
5. Enter the per-unit cost rate in the **Std. Rate** column (**Standard Rate** field) and/or **Cost/Use** column (**Cost per Use** field). Make sure the rate per unit you enter corresponds to the unit of measure you entered in the **Material Label** field.
6. In the field **Accrue at** determine when the cost will be incurred by selecting **Start, Prorated or End**.
7. MS Project calculates the cost of using the material resource on the task using the following *formula*:
   *Cost = Std. Rate * Assignment Units + Cost/Use * Assignment Units*.

Topic 3: Editing the Resource Calendar



The resource calendar will initially have the same holidays and working times as the project calendar (or its base calendar if the resource has one). You can override these times and holidays on each individual resource calendar and capture when a person goes on vacation.

To edit a resource calendar you can:

Double-click on a resource and in the **Resource Information** dialog, click on tab **General** and then click 

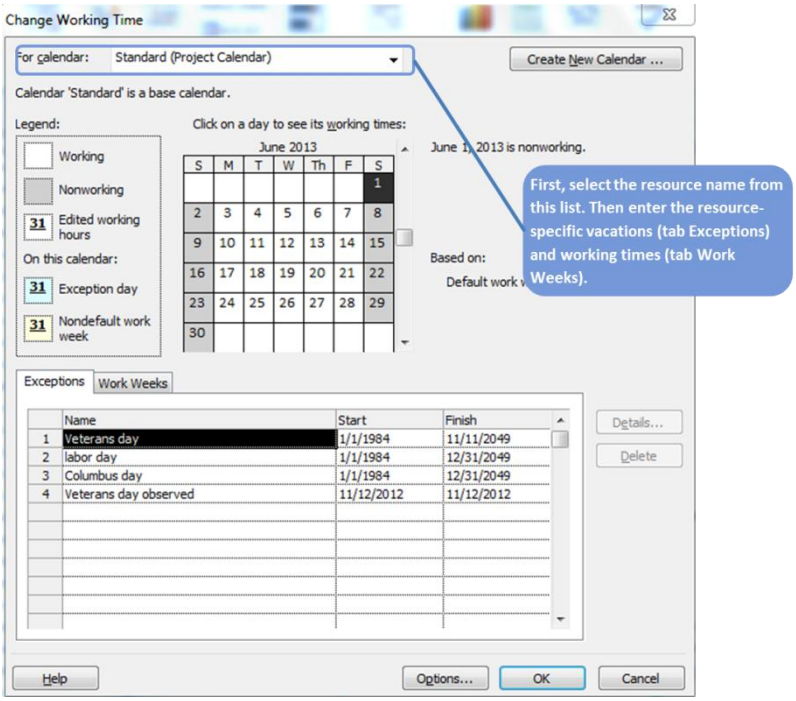
. This will allow you to do one resource at a time.

OR

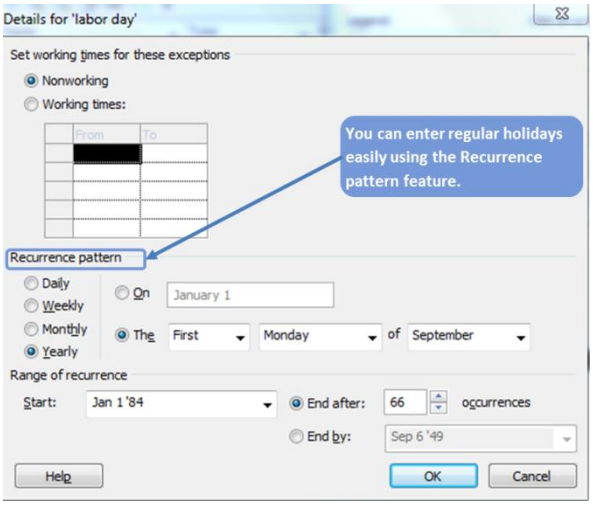
If you want to edit several resource calendars in a row:

1. Click ribbon Project and 

- the Change Working Time dialog appears:

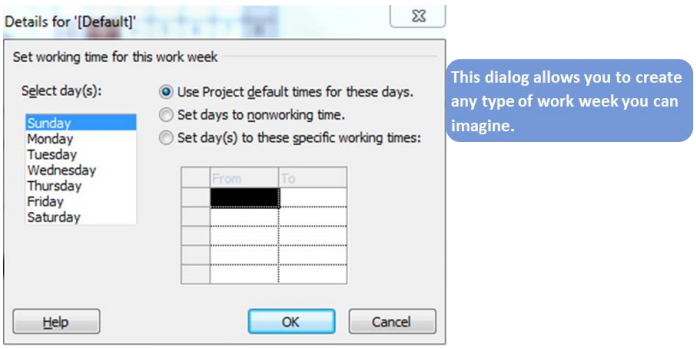


2. In the list **For** select the resource whose calendar needs to be changed.
3. Click the tab **Exceptions** where you can enter the vacation days of the individual.
4. Either select the vacation days in the calendar grid and then type the name of the vacation in the field **Name** at the bottom and press the **Enter** key,
   OR
   You enter a **Name** first and click Details... - the **Details for <name of the vacation>** appears:



5. Select Nonworking and under **Range of recurrence** enter the **Start** and **End by** dates for the vacation days. Click **OK** and you are back in the **Change Working Time** dialog.

6. Click the tab **Work Weeks;** here you enter what the working days of the week are and the normal working hours on those days. Select the item **[Default]** in the list. Click Details... and the **Details for '[Default]'** dialog appears:



7. Select the workdays of the week by dragging over the weekdays in the list **Select Day(s)**. If the days you select are not consecutive, select one and then hold down the **Ctrl** key to select the other days.

8. Select one of three options:
   Use times from base calendar for these days.
   This option sets the times back to the times of the calendar which is the basis of this resource calendar, or
   Set days to nonworking time.
   Indicates what days are weekend days.
   Set day(s) to these specific working times:
   This option changes the working hours. Then, enter the times in the grid.

9. Select the weekend days in the list **Select Day(s)**. If the weekend days are Saturday and Sunday, select **Sunday**; hold down **Ctrl** and click on **Saturday**. Select the option Set days to nonworking time.

10. Click **OK** when done; you are now back in the **Change Working Time** dialog.
11. To enter another resource calendar select the next resource from the list **For** at the top and enter the workweek or click **OK** when you are done with all resources.

Exercise 7.1: Entering Resources for the Relocation Project

Instructions:
The goal of this exercise is to be able to enter deadlines and constraints into the schedule.

Continue to work with your file *Relocation.mpp* or open *Exercise 6.mpp*.

1. See table below: the fields *Position* and *Function* are not standard fields in MS Project; you will have to create them. Click ribbon **Project**, button **Custom Fields**: select **Resource** and select from the **Type**, the item **Text** to display text fields. Click **Rename** and rename the field **Text1** to *Position* and **Text2** to *Function*. Click the **OK** button.
2. Customize the table for the Resource Sheet view as shown in the table below. You will need to insert the fields Position and Function and remove some other fields.
3. Notice that in the table below we present the **Max Units** in decimals, whereas MS Project shows percentages by default. Click ribbon **File**, **Options**, tab **Schedule** and, in the section **Schedule**, change **Show Assignment units as a** to **Decimal**.
4. Enter the resources from the table below into the Resource Sheet. Use the **Fill Down** feature for the columns *Function* and *Accrue at*. Notice that there are generic resources in the table, like *movers*. There is no **Cost/Use** for these resources.
5. Sort the list of resources on resource Name as the first sorting key (ribbon View, button Sort, item Sort by). Select the option to permanently renumber the resources.
6. *Nancy Hillcrest* will go on a 1-week vacation in the third full week of August 2012. Create and **Exception** called *Vacation Nancy*.
7. You realize that due to the project requirement of minimal disruption to normal operations, the move will have to take place over the weekend. Set the weekend days to working days and all the weekdays to nonworking days for the resource movers. The result should be that the move task takes place over a weekend once the movers are assigned to the task. The movers will work 8 hours per weekend day.
8. Compare your file with the solution *Exercise 7.mpp*.
9. Save your file.

Resource Name	Type	Material Label	Position	Function	Max Units	Std. Rate	Accrue at
Your name	Work		project manager	manager	1	$75/h	Prorated
I.M. DeBoss	Work		CEO	manager	1	$150/h	Prorated
John Falgon	Work		Employee representative	Employee	1	$30/h	Prorated
Nancy Hilcrest	Work		planner	Employee	1	$35/h	Prorated
Pierre Roach	Work		lawyer	External	1	$75/h	Prorated
employees	Work		Employees	Employee	75	$25/h	Prorated

Resource Name	Type	Material Label	Position	Function	Max Units	Std. Rate	Accrue at
contractor	Work		Contractor	External	50	$30/h	End
realtor	Work		Realtor	External	1	$35/h	End
movers	Work		Movers	External	40	$25/h	End
LAN consultants	Work		LAN Consultants	External	20	$75/h	End
boxes	Material	boxes		material		$2	Start

Lesson 7 Checklist: Best Practices for Entering Resources

- Are all the resources identified in the **Resource Sheet**?
- Are all resources named consistently using a naming convention?
- Is the availability of the resource appropriately modeled?
- Do all resources have their **Type** field set right?
- Are the rates entered in the appropriate fields?

Notes

LESSON 8: ENTERING ASSIGNMENTS

Topic 1: What is an Assignment?

Topic 2: Assignments and Types of Detail Tasks

Topic 3: Assigning Resources

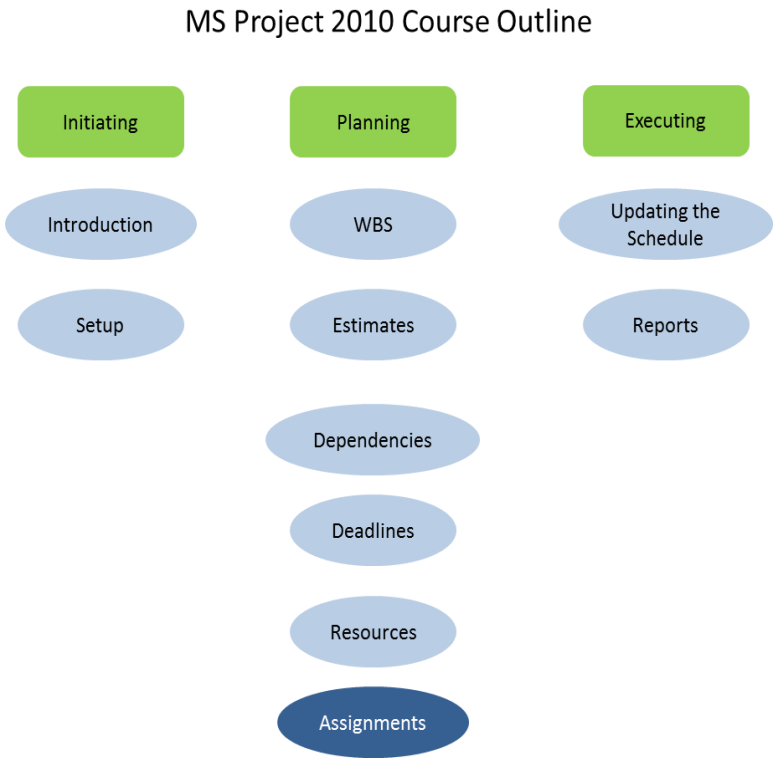
Topic 4: Changing Tasks and Assignments

Student Learning Objectives

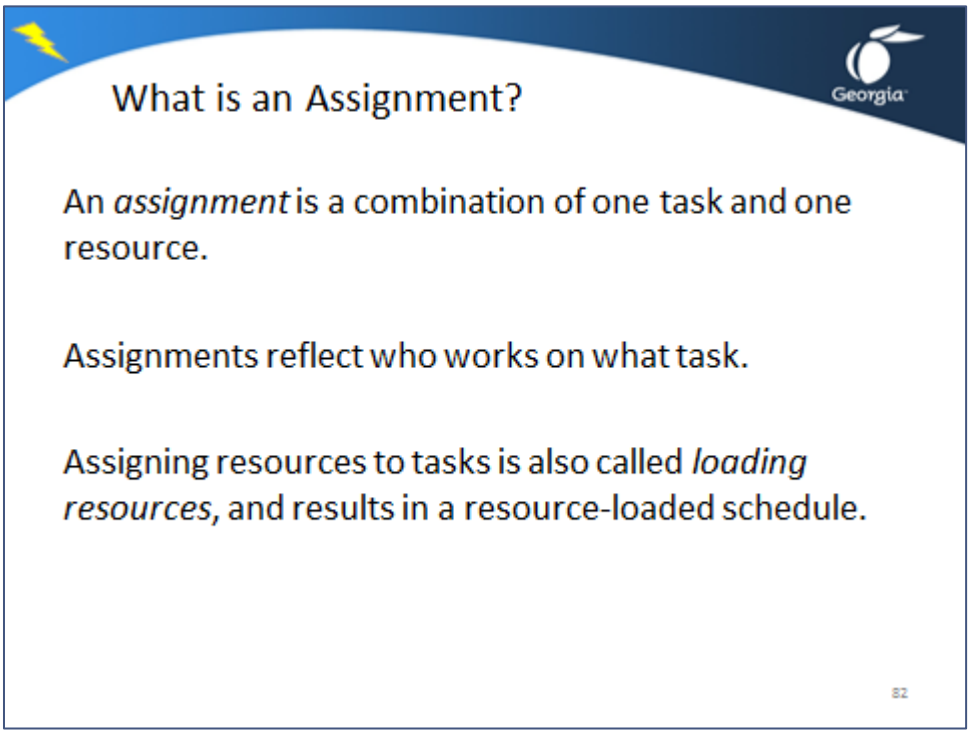
After completing this lesson you should be able to

- Understand what an assignment is
- Understand the various data elements used for tasks, resources, and assignments
- Understand how to assign resources using the Assign Resources dialog or the Task Form view
- Understand how to change assignments for Fixed Duration , Fixed Units, and Fixed Work tasks

Approximate Presentation time: 1 hour 30 minutes



Topic 1: What is an Assignment?



An *assignment* is a combination of one task and one resource. Assignments reflect who works on what task. Notice the screenshot below. *Nancy* is assigned to *summarize requirements* and *visit the sites* among other tasks. Assigning resources to tasks is also called loading resources, and results in a resource-loaded schedule.

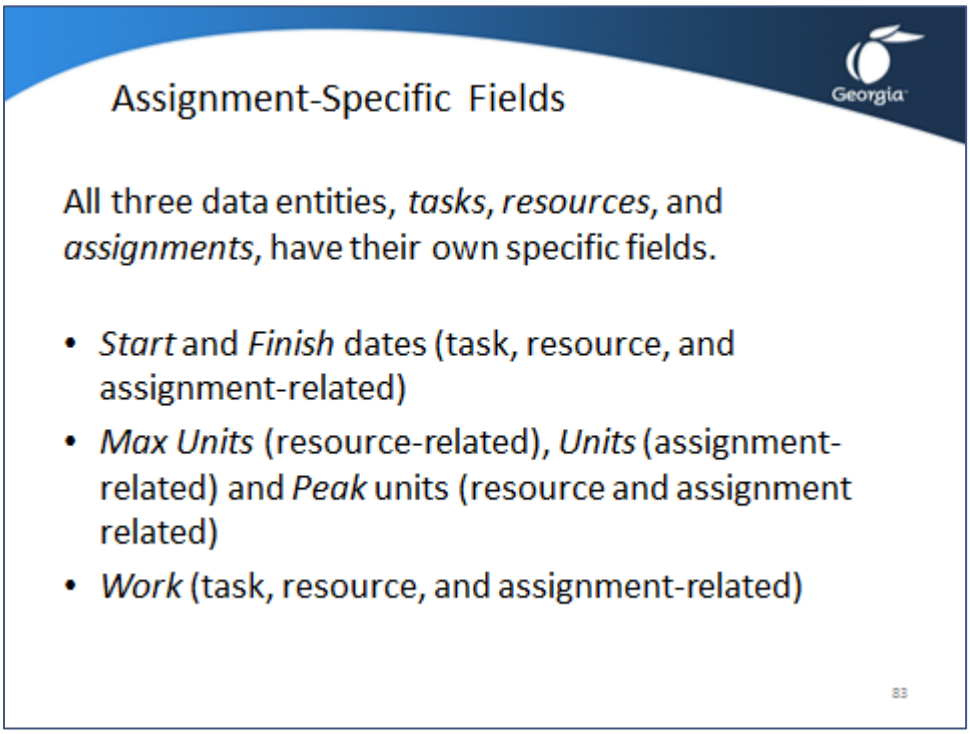
Resource Usage view:
Resource record of Nancy Hilcrest

		Resource Name	Work	Add New Column	Details	Aug 5, '12 S	M	T	W	T	F
3		Nancy Hilcrest	5 days		Work			1.5d	0.5d	0.5d	0.5d
		summarize re	*2 days*		Work			0.5d	0.5d	0.5d	0.5d
		visit the sites	*1 day*		Work			1d			
		evaluate the	*1 day*		Work						
		meet to selec	*0 days*		Work						
		meet to discu	*1 day*		Work						

Nancy's five assignment records: no ID number, italic text and lighter background in the timescale.

Double-click on an assignment and the **Assignment Information** dialog will appear with only assignment-specific fields. If you double-click on the resource record, you get the **Resource Information** dialog.

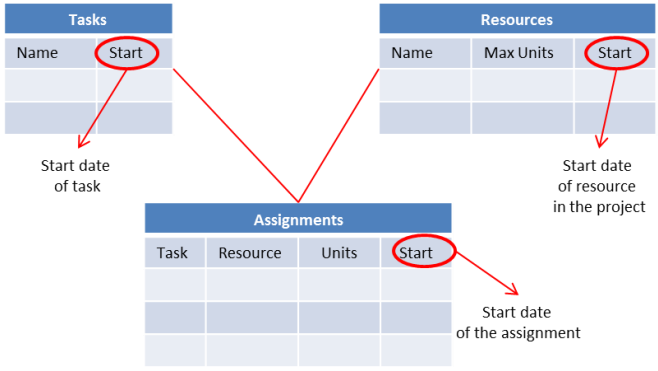
Topic 1: Assignment-Specific Fields



All three data entities, tasks, resources, and assignments, have their own specific fields. We will discuss three examples in more detail:

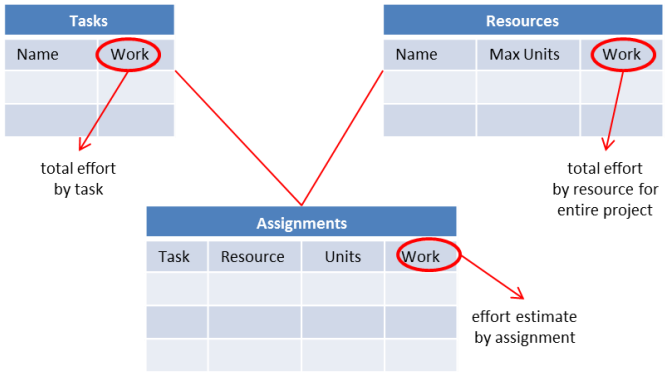
- *Start* and *Finish* dates (task, resource, and assignment-related)
- *Max Units* (resource-related), *Units* (assignment-related) and *Peak* units (resource and assignment related)
- *Work* (task, resource, and assignment-related)

Start and Finish Dates



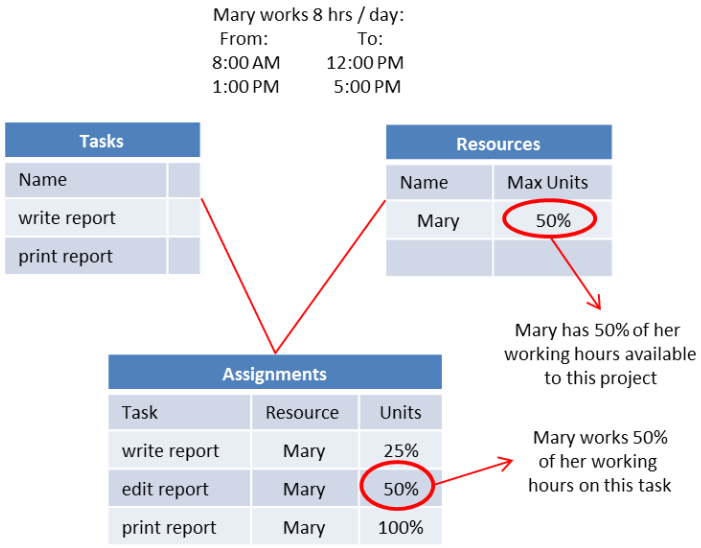
The start date of a task is not necessarily the same as the start date of its assignments. The start date of a task is when any one of the resources starts working on the task. The start date of the resource is the earliest assignment in the entire project. For example, if Mary only works the last 2 days of the 5-day task, the start date of her assignment is different from the start date of the task.

Work



Although they all have the same name, the field **Work** for tasks in the Gantt spreadsheet is not the same as the field **Work** on the Resource Sheet, nor is it the same as the assignment-related field **Work** on the Task Form. In the Gantt Chart, **Work** is the total effort of all resources working on the task. In the Resource Sheet, **Work** is the total effort for the resource in the entire project. On the Task Form you see the assignment-related **Work** field, which displays the effort of one resource on one particular task.

Max Units, Units, and Peak



The last set of similar fields that look alike but are very different are:

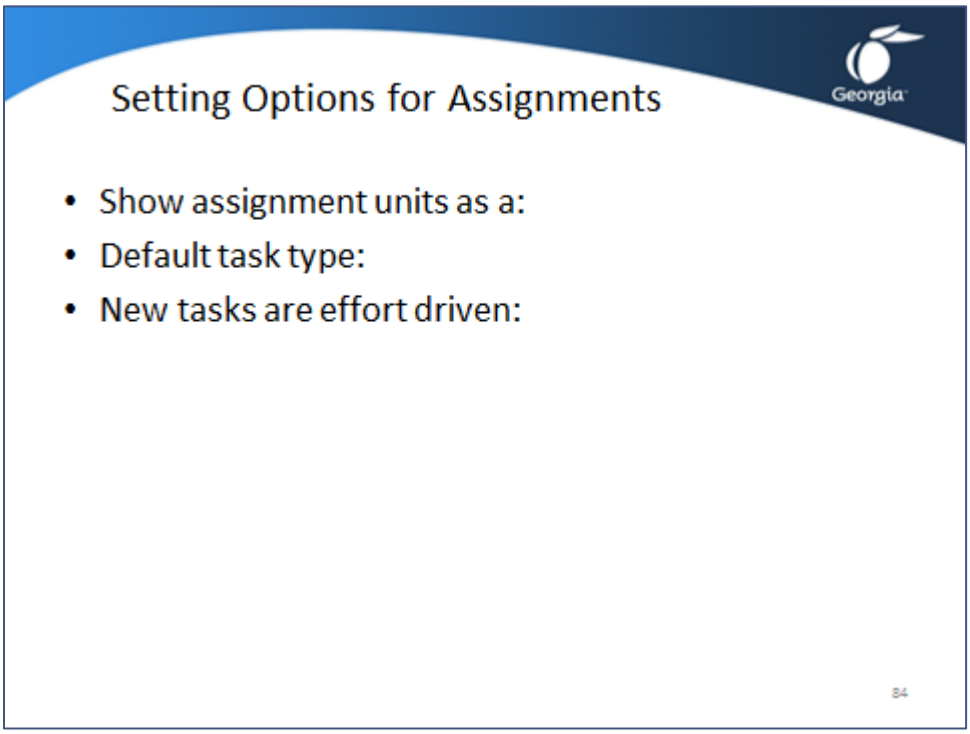
- Resource-related **Max Units**
- Assignment-related field **Units** (appears as **Assignment Units** in usage views)
- Resource- and assignment-related field **Peak**.

The **Max Units** field of a resource reflects the maximum availability of the resource to the project. The assignment-related field **Units** is the percentage of working hours a resource is working on the task. The **Peak** field (**Peak Units**) is predominantly assignment-related, but is also displays resource-related values. As a resource-related field it shows the highest percentage across all the assignments of the resource, an indication of overallocation. As an assignment-related field it shows the highest percentage across all days of the assignment. The **Peak** field is calculated by MS Project.

In summary:

- The resource field **Max Units** represents entered availability.
- The assignment field **Units** (**Assignments Units**) represents entered usage.
- The assignment field **Peak** (**Peak Units**) represents calculated usage.

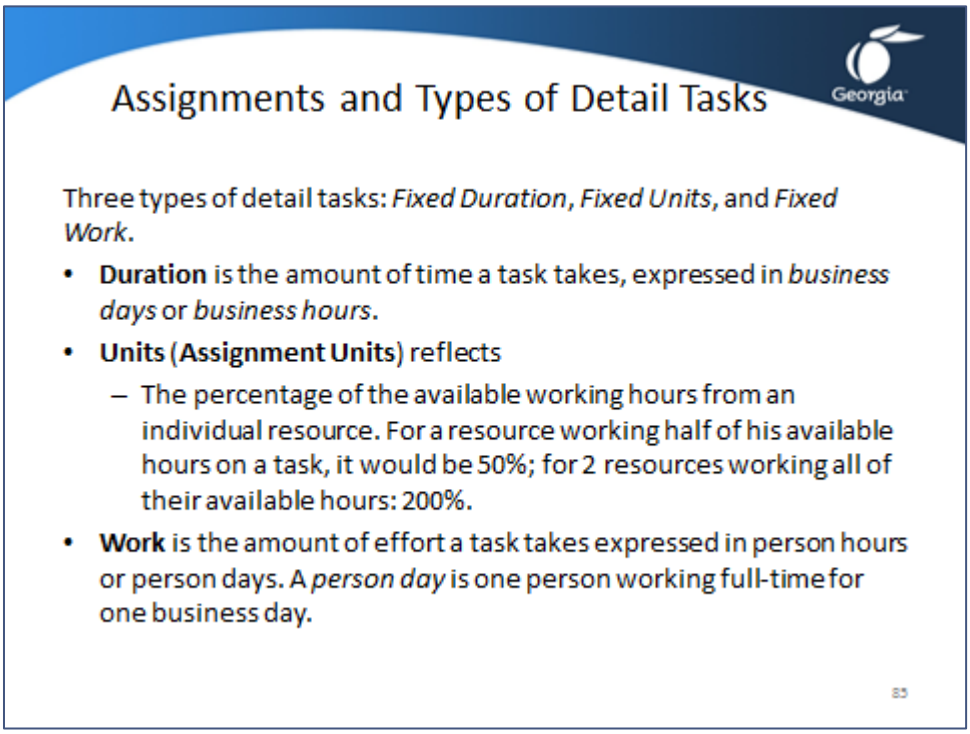
Topic 1: Setting the Assignment Options



Click the ribbon **File**, **Options** and click on the tab indicated in the table below where you want to change settings.

Tab	Option
Schedule	Section **Schedule:** **Show assignment units as a: Percentage** Percentage is the best choice when you have part-time resources. If there are mostly *team resources* (consolidated), **Decimal** is better, since "5 carpenters" is easier to understand than "500% carpenters". This option is a global option; if you change it to **Decimal** in one project, all your projects will use decimal numbers.
	In the **Scheduling options for this project** section**:** **Default task type:** Fixed Units Choose the type of task for any new tasks you create.
	New tasks are effort driven (unchecked): Using this option may result in MS Project changing assignment units. For now, turn it off.

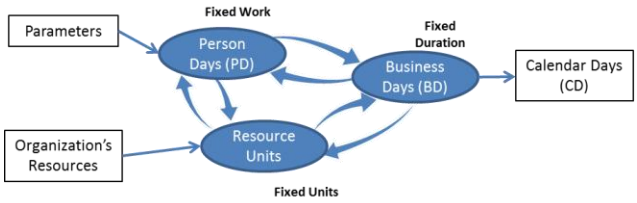
Topic 2: Assignments and Types of Detail Tasks



Types of Detail Tasks

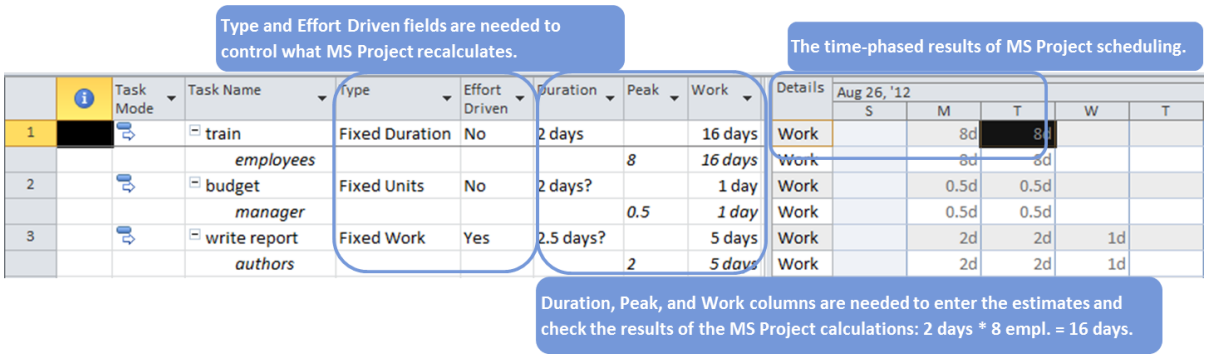
There are three types of detail tasks: *Fixed Duration*, *Fixed Units*, and *Fixed Work*. Each task has three variables:

- **Duration** is the amount of time a task takes, expressed in *business days* or *business hours*.
- **Units** (**Assignment Units**) reflects
    - The percentage of the available working hours from an individual resource. For a resource working half of his available hours on a task, it would be 50%; for 2 resources working all of their available hours: 200%.
    - The number of people assigned from a *team resource* (consolidated resource).
- **Work** is the amount of effort a task takes expressed in person hours or person days. A *person day* is one person working full-time for one business day.



It is recommended using Fixed Duration or Fixed Work tasks when first entering estimates. Be aware of the task type when you assign resources, because each type of task makes MS Project calculate differently. For example, MS Project will never recalculate the duration of a fixed duration task, and if you add a second resource, it will double the work for the task following the formula **Duration * Peak Units = Work**, where **Peak Units** is the number of resources assigned.

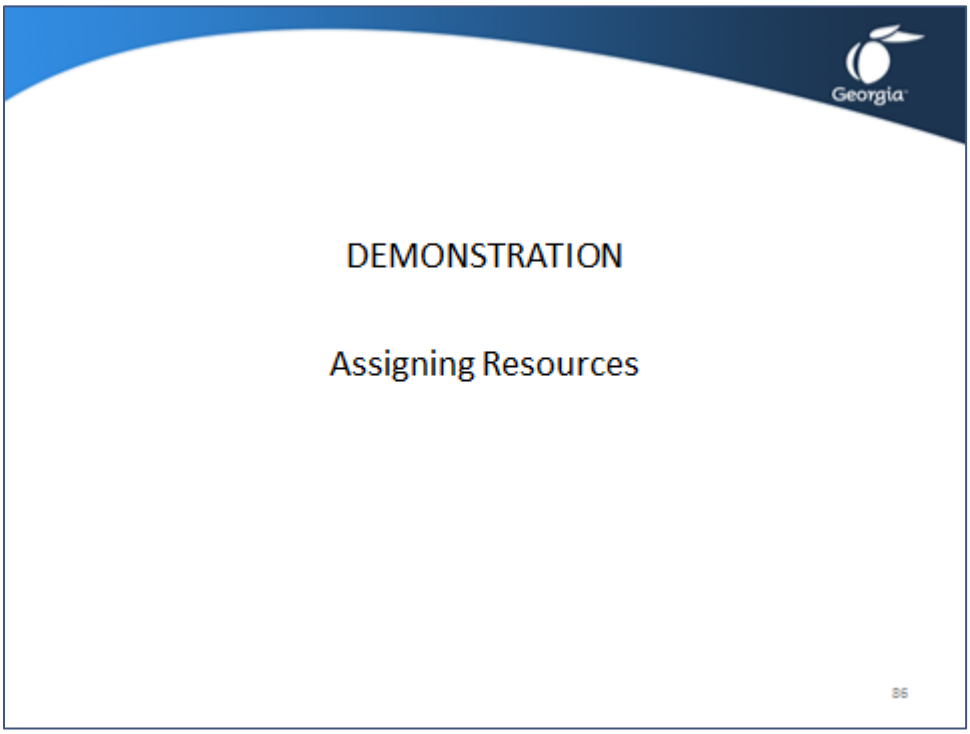
The following **Task Usage** view is recommended when working with assignments:



	Task Mode	Task Name	Type	Effort Driven	Duration	Peak	Work	Details	Aug 26, '12 S	M	T	W	T
1		train	Fixed Duration	No	2 days		16 days	Work		8d	8d		
		employees				*8*	*16 days*	Work		8d	8d		
2		budget	Fixed Units	No	2 days?		1 day	Work		0.5d	0.5d		
		manager				*0.5*	*1 day*	Work		0.5d	0.5d		
3		write report	Fixed Work	Yes	2.5 days?		5 days	Work		2d	2d	1d	
		authors				*2*	*5 days*	Work		2d	2d	1d	

We can now see all three variables of the formula **Duration * Peak Units = Work**. If there are multiple resources assigned to a task, you have to add their Peak units to arrive at the total number of units used in the formula.

Topic 3: Assigning Resources

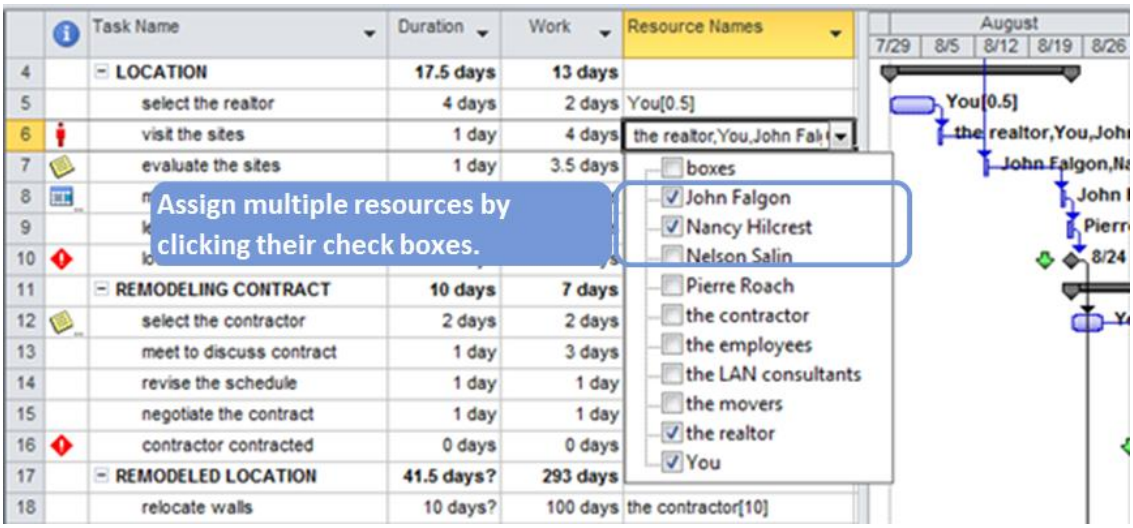


There are multiple ways to assign a resource to a task. We will cover three ways that are most commonly used. The other three ways will be covered in the second course.

Open the demonstration file **Demo Lesson 8 Entering Assignments 2**.

Assignments Using the Task Sheet View

A new feature in Project 2010 is the ability to assign multiple resources to a task in the Resource Names field by using the list of resources and the check boxes that is displayed.



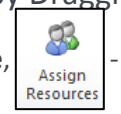
If you assign in this way, Project 2010 will assign the maximum availability of an individual resource (*Max Units*) and only one unit of *team resources*.

Assignments Using the Assign Resources Dialog Box

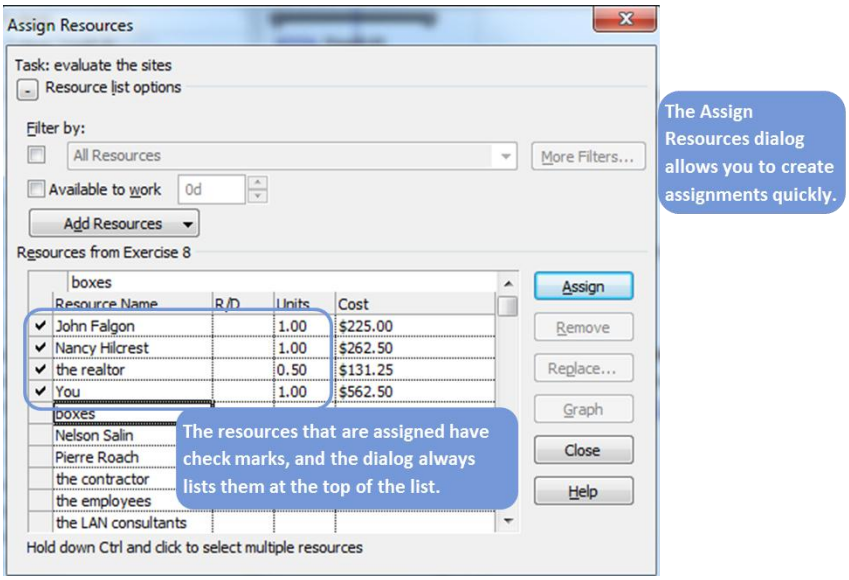
The **Assign Resources** dialog has the following features:

- It is only enabled in a task view, not in resource views.
- It is a floating dialog that allows you to click on tasks while it remains displayed.
- It puts all the resources that are assigned to the selected task at the top of the list.
- It always sorts the rest of the resources alphabetically.
- It provides filtering options to determine which resources are available.

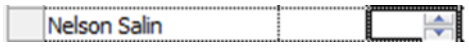
Assigning Resources by Dragging

Click ribbon **Resource**, 

- **Assign Resources** floating dialog appears:

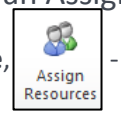


1. Click the resource to be assigned.
2. Point to the resource selector ☐ in front of the resource name; the mouse pointer now has a person's head attached:

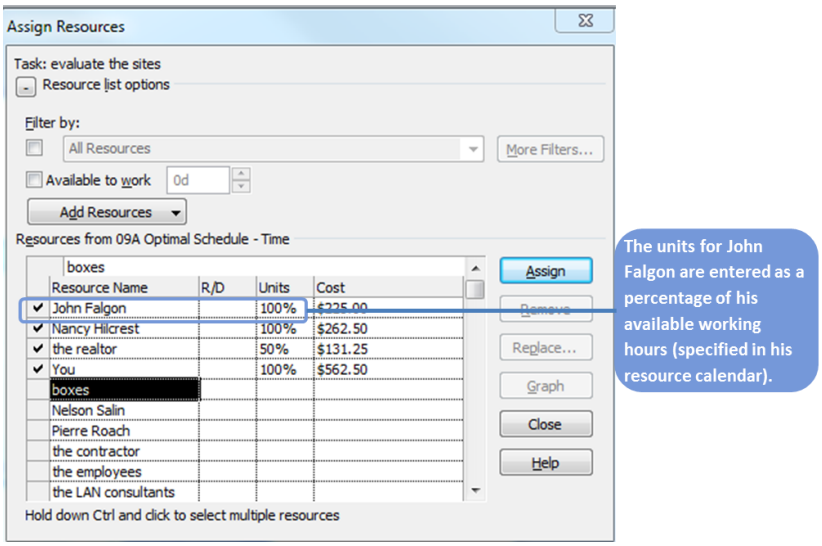


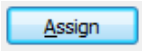
3. Holding down the primary mouse button, drag and drop the resource onto the task you want to assign. The resource is now assigned; it has a check mark in front of its name.

Entering the Units on an Assignment

1. Click ribbon **Resource**, 

- **Assign Resources** floating dialog appears.
2. In the field Units, enter the percentage or decimal of the resource's available working hours.



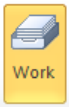
3. Click 

- MS Project recalculated the work of a **Fixed Duration** task, or recalculated the duration of a **Fixed Work** task.

Assignments Using the Task Form

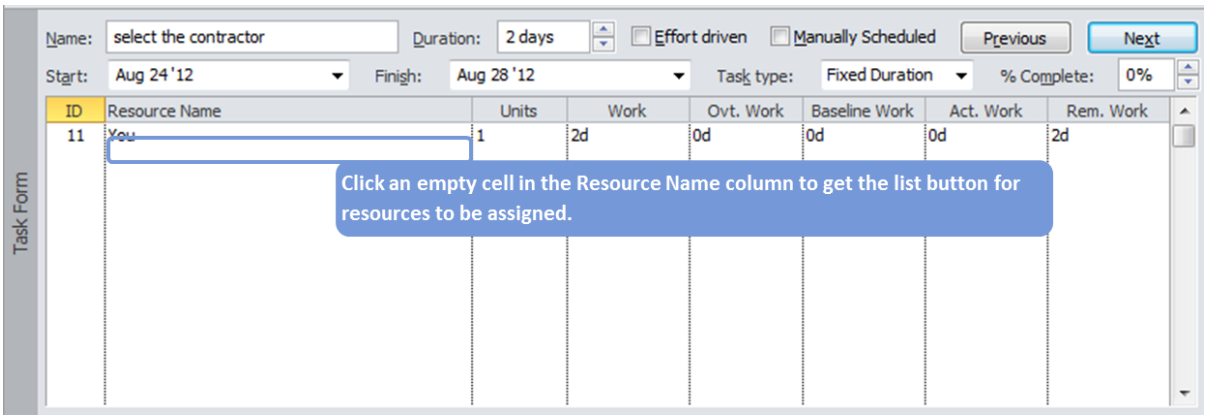
1. In the Gantt Chart, click the ribbon View, 

to display the Task Form.
2. On the Task Form, we need to see at least the fields **Resource Name**, **Units**, and **Work**.

   Click ribbon Format and click 

, **OR**

   Right-click anywhere in the gray space on the Task Form and select **Work** from the popup menu. The Task form should look like this:



3. On the Task Form, click on an empty cell in the field **Resource Name**; a list button will appear.
4. Click the list button then select a resource from the list that appears. Enter the **Units** (the percentage of the available working hours) or the **Work** (person hours of effort needed). **Enter only one of the two and let the third be calculated.**
5. When all resources are assigned, click **OK**.

Exercise 8.1: Entering Assignments for the Relocation Project

Instructions:

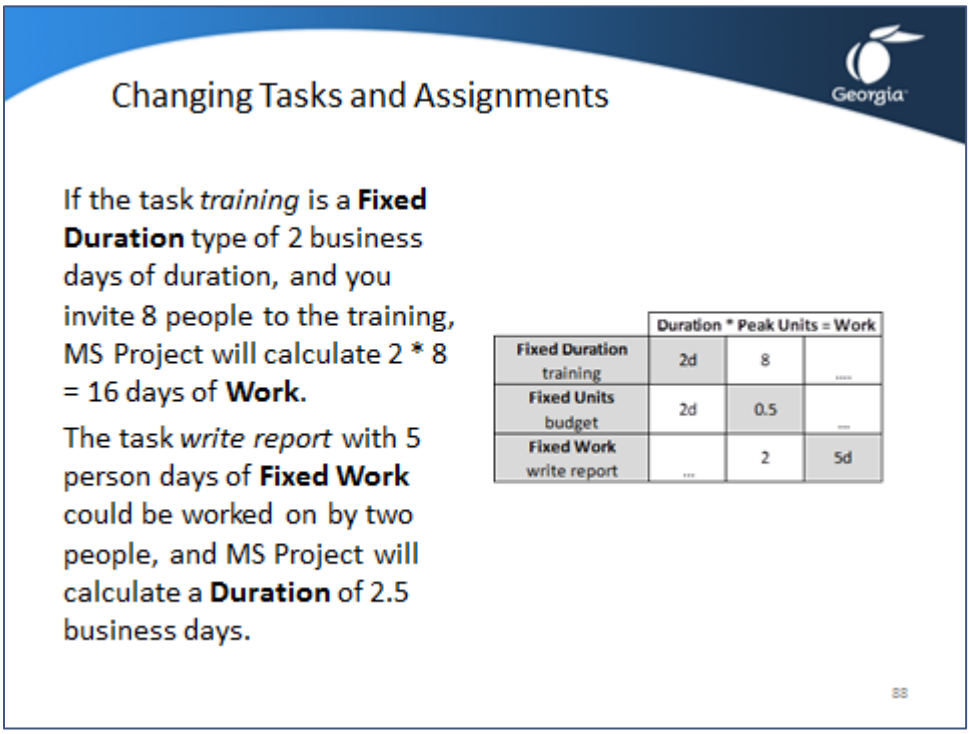
The goal of this exercise is to be able to assign resources to all detailed tasks.

1. Continue to work with your file *Relocation.mpp* or open *Exercise 7.mpp*.
2. Add the fields **Type, Duration**, and **Work** to the Gantt Chart view in such a way that the view matches the column headings of the *task fields* in the table below. Note that you cannot add the column *Units* shown in the table below as a column to the Gantt Chart.
3. The units are presented in decimals in the table below, whereas MS Project will show percentages by default. Click ribbon **File**, **Options**, tab **Schedule** and change **Show Assignment units as a** to **Decimal** in order to enter the numbers as shown.
4. The next table provides all assignment information for the Relocation project. Enter all assignments including their units by using the **Assign Resources** dialog (ribbon **Resource**, button **Assign Resources**) or the **Task Form** (click ribbon **View, Details**). The **Task Form** is best when you want to assign multiple resources and enter specific numbers for units and/or work.
5. Compare your file with the solution *Exercise 8.mpp*.
6. Save your file.

TASK FIELDS				**ASSIGNMENT FIELDS**	
Task Name	**Type**	**Dur**	**Work**	**Resource Names**	**Units**
REQUIREMENTS	Fixed Duration				
Research staff requirements	Fixed Work		2 d	You	0.5
Summarize requirements	Fixed Work		2 d	Hilcrest	0.5
LOCATION	Fixed Duration				
Select the realtor	Fixed Duration	4 d		You	0.5
Visit the sites	Fixed Duration	1 d		Falgon Hilcrest The realtor You	1 1 1 1
Evaluate the sites	Fixed Duration	1 d		Falgon Hilcrest The realtor You	1 1 0.5 1
Meet to select the location	Fixed Duration	1 d		Falgon Hilcrest DeBoss You	1 1 1 1
Legal review	Fixed Duration	0.5 d		Roach	1
REMODELING CONTRACT	Fixed Duration				
Select the contractor	Fixed Duration	2 d		You	1
Meet to discuss contract	Fixed Duration	1 d		You The contractor Hilcrest	1 1 1

TASK FIELDS				ASSIGNMENT FIELDS	
Task Name	**Type**	**Dur**	**Work**	**Resource Names**	**Units**
Revise the schedule	Fixed Duration	1 d		You	1
Negotiate the contract	Fixed Duration	1 d		You	1
REMODELED LOCATION	Fixed Duration				
Relocate walls	Fixed Work		100 d	The contractor	10
Install electric wiring	Fixed Work		25 d	The contractor	5
Paint	Fixed Work		8 d	The contractor	4
Drying of paint	Fixed Duration	4 ed			
Install cabinetry	Fixed Work		40 d	The contractor	8
Install LAN	Fixed Work		60 d	The LAN consultants	5
Lay carpet	Fixed Work		60 d	The contractor	6
MOVE	Fixed Duration				
Select mover	Fixed Duration	2 d		You	1
Pack	Fixed Duration	2 d		The employees Boxes	35 400
Move	Fixed Work		20 d	The movers	10
Unpack	Fixed Duration	2 d		The employees	35

Topic 4: Changing Tasks and Assignments



Assigning and the Types of Tasks

It is not a coincidence that each Type of task relates to one of the variables in the formula: **Fixed Duration, Fixed Units**, and **Fixed Work**. Each of the three types protects one of the three variables in the formula. If you set a task to **Fixed Duration**, MS Project will never change this duration. When you enter the second value, MS Project will calculate the third one for you.

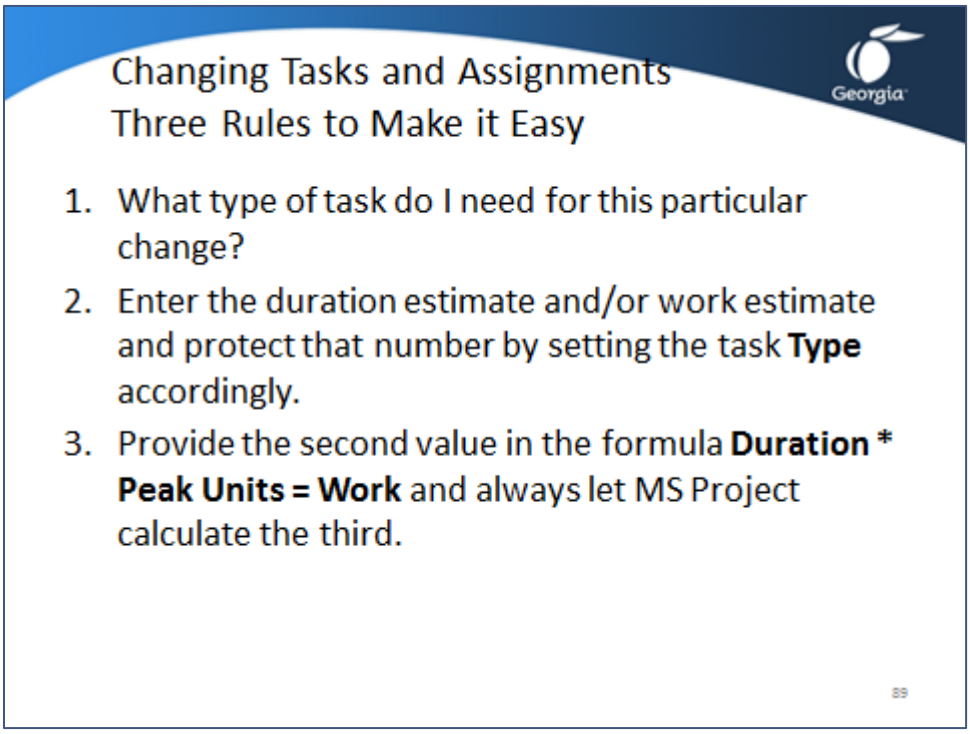
	Duration * Peak Units = Work		
Fixed Duration training	2d	8	....
Fixed Units budget	2d	0.5	...
Fixed Work write report	...	2	5d

Example: If the task *training* is a **Fixed Duration** type of 2 business days of duration, and you invite 8 people to the training, MS Project will calculate 2 * 8 = 16 days of **Work**. Another example: the task *write report* with 5 person days of **Fixed Work** could be worked on by two people, and MS Project will calculate a **Duration** of 2.5 business days.

The following table suggests the best use of each task **Type**. Note that you can only change the task **Type** on tasks with the **Task Mode** set to **Auto Scheduled**. **Manually Scheduled** tasks always work like **Fixed Duration** tasks regardless what their **Type** field displays.

Type of Task	Use in situations like:
Fixed Duration	When the task is *schedule driven*: • When the duration is the first thing you estimate. • If the duration does not decrease when human resources are added. • Tasks that always have a group of resources assigned, such as *meeting* or *training*. • When the deadline is so tight that it drives the duration of the task; you have to make it work within the time frame. • When workload is not your problem (e.g., tasks for external resources, such as subcontractors and consultants).
Fixed Units (default)	When the task is *resource driven*: • When the number of resources you have for the task is the first thing you know. • When you cannot get more resources to do the work, for example, you only have two internal resources. • When you want MS Project to calculate the duration or the work on a task while keeping the same number of people working on the task (*peak units*). • When you want to keep the resource working on a task at a certain percentage of his available hours.
Fixed Work	When the task is effort driven: • When the effort required is the first thing you estimate. • When the effort required is the easiest thing to estimate, which is often the case. For example, you estimate that painting a home takes 12 person days of effort; or a software developer may estimate that coding a module will take 20 person hours. Estimating effort is often easier and more accurate than estimating duration.

Topic 4: Changing Tasks and Assignments – Three Rules to Make It Easy



Making MS Project an Easy Tool for you to Use

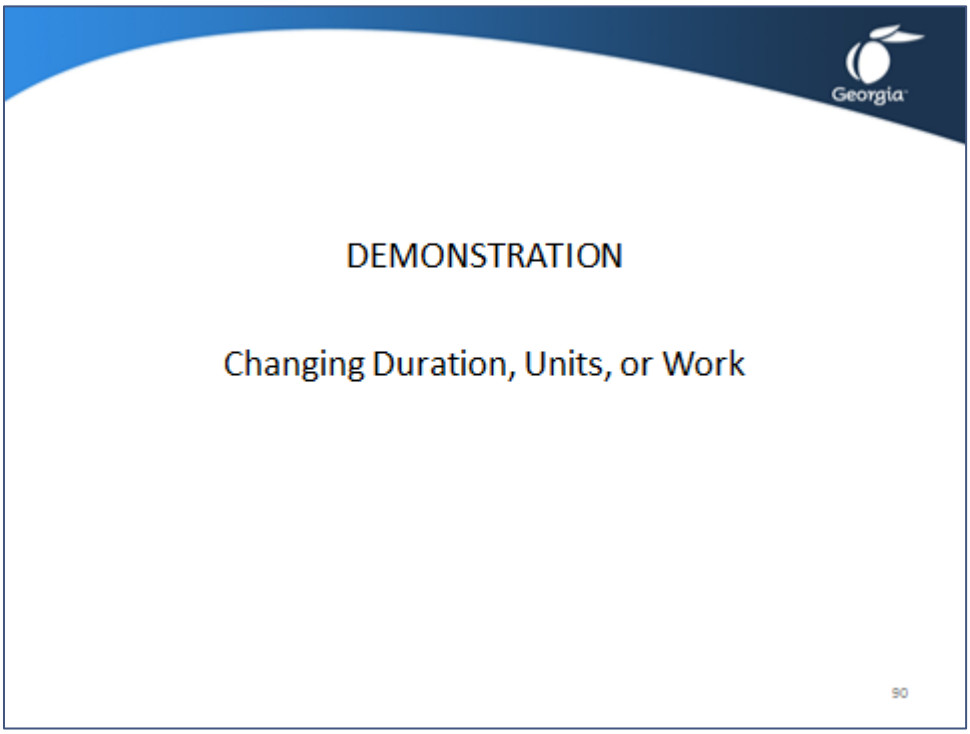
If you want to eliminate the MS Project nightmares, simply follow these three rules:

1. Enter the duration estimate and/or work estimate and protect that number by setting the task **Type** accordingly (you will need to first change the **Task Mode** to **Auto Scheduled** so you can set the task **Type**):
    a. If you enter a **Duration** estimate, you need to set the task **Type** to **Fixed Duration** and set **Effort Driven** to **No**.
    b. If you enter a **Work** estimate, you need to set the task **Type** to **Fixed Work**.
    c. If you enter both **Duration** and **Work**, you protect one of them.

    This rule will ensure that MS Project does not change estimates that you determined and entered.

2. Provide the second value in the formula **Duration * Peak Units = Work** and always let MS Project calculate the third.
3. Before making any change to any three values in the formula, reconsider the task **Type** by asking yourself: *What type of task do I need for this particular change?*

Topic 4: Changing Tasks and Assignments – Changing Duration, Units, or Work



Open the demonstration file **Demo Lesson 8 Entering Assignments 3**.

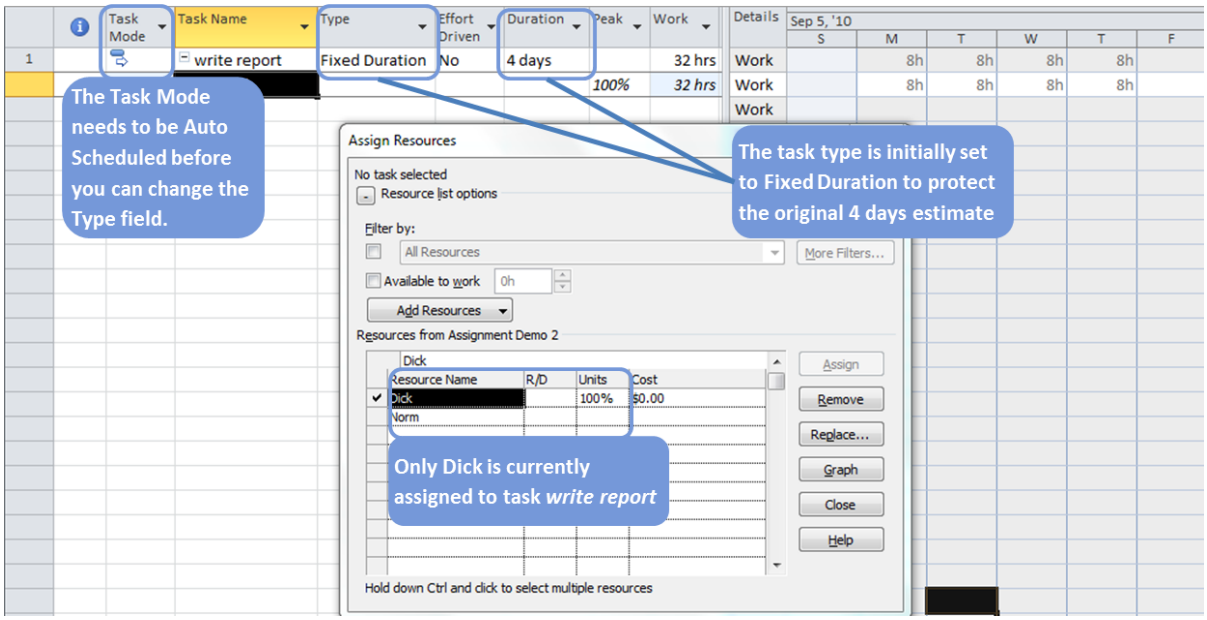
Before you manipulate values in the *formula* **Duration * Peak Units = Work**, you should always think first about the task type you need for that change. With every change, MS Project will surely recalculate one other field, and it may recalculate the one you did not want changed. It is recommended that you follow the following steps when changing an *assignment*.

1. Protect one of the three values first by setting the task **Type** and turning off **Effort Driven**. You can determine the appropriate task **Type** by asking yourself: *If I change this value in the formula; which of the other two values do I want to keep the same?* The answer to this question will tell you which task type you need to protect. For example, if you want to change the units and protect the duration value, you should set the **Type** to **Fixed Duration** and set **Effort Driven** to **No**.

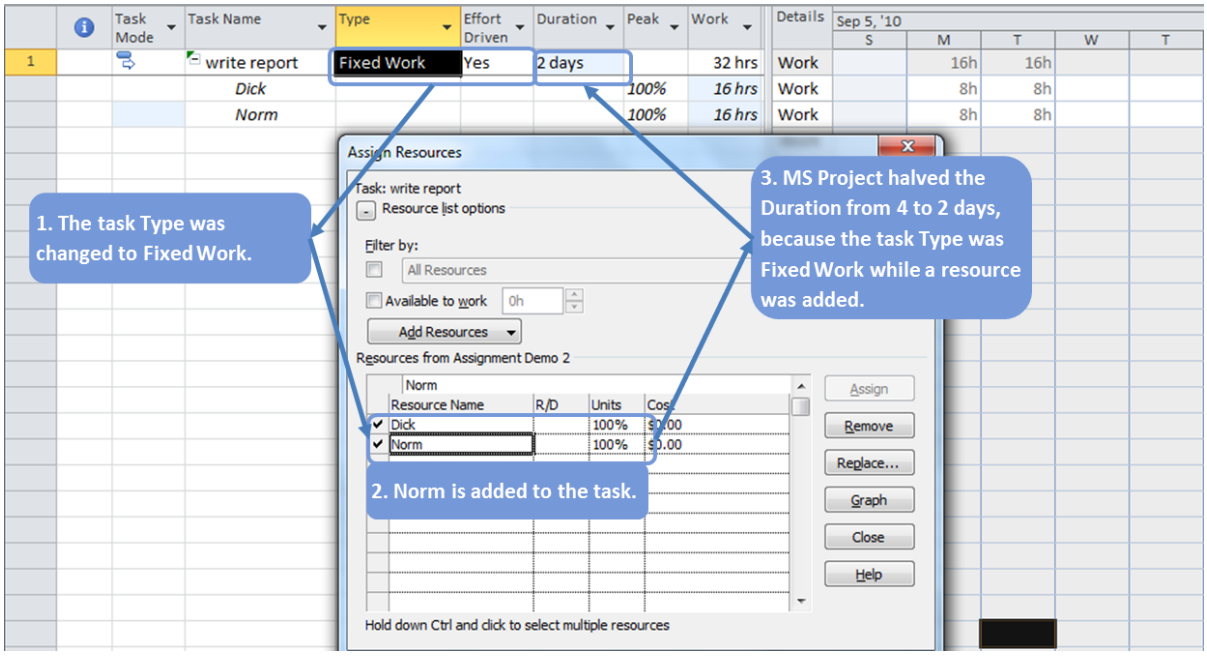
2. Change the value that you wanted to change.

3. Let MS Project recalculate the third value. For example, if you change the **Units** on a **Fixed Duration** task, MS Project will recalculate the **Work**.

Here is an example of how this works. Assume you have created a **Fixed Duration** task *write report* of *4 days* with one resource assigned. This will appear in MS Project as:



You want to add a second resource, but you want MS Project to keep the **Work** (effort) the same when you add the resource. You need the task type **Fixed Work** (which is automatically **Effort Driven**):



In this example, you should ask the question: *If I change the units, do I want to keep the Duration or the Work the same?* You want to keep the work the same, therefore, you need the task type **Fixed Work**.

Exercise 8.2: Changing Assignments for the Relocation Project

Instructions:
The goal of this exercise is to be able to control the calculations that MS Project makes when changing values of the assignments. Open *Exercise 8a.mpp*.

1. You would like to know how much work the task *install LAN* would take if there were *6 LAN consultants* instead of 5 while keeping the duration the same. What task type should be used?

   Type: …….. Effort Driven: …….
   You should get a Work value of 72 days; continue with this number for the next scenario.

2. You want to know how many consultants are needed if you want the task *install LAN* done in 3 days while keeping the work the same. What task type do you need before making this change?

   Type: …….. Effort Driven: …….
   You should find that 24 *LAN consultants* are needed in the **Peak** field on the assignment; continue with this number of consultants for the next scenario.

3. You think you overestimated the work; you will need only 30 days instead of 72 days and you want to keep the duration to 3 days. What task type do you need before you make this change?

   Type: …….. Effort Driven: …….
   You should find that 10 consultants are needed in the **Peak** field on the assignment; continue with this number of consultants for the next scenario.

4. You want to keep the number of consultants to 10, but you want to change the duration from 3 to 12 days. How much work is now on the task? What task type do you need before you make this change?

   Type: …….. Effort Driven: …….
   You should end up with 72 days of work; continue with this duration for the next scenario.

5. You want to bring the number of consultants down to 5 while keeping the 12-day duration. How much work is now on the task? What task type do you need before you make this change?

   Type: …….. Effort Driven: …….
   The work should now be 60 days, which brings us back to where we were at the start of this exercise.

6. Close the file without saving.

Lesson 8 Checklist: Best Practices for Entering Assignments

- Are you using the task-related field **Type** for **Auto-Scheduled** detail tasks?
- Is **Effort-Driven** off for **Fixed Duration** and **Fixed Units** tasks (Auto-Scheduled)?
- Are there no assignments on the summary tasks?
- Do all detail tasks have a human resource assigned?

Notes

LESSON 9: UPDATING THE SCHEDULE

Topic 1: Introduction to Schedule Updating

Topic 2: Baseline the Schedule

Topic 3: Progressing the Schedule and Updating Tasks

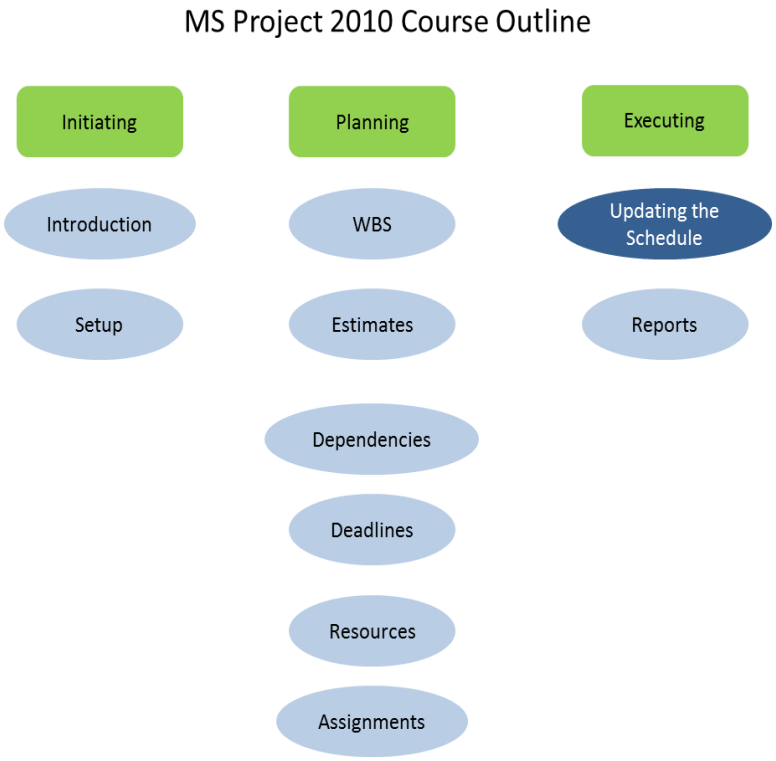
Topic 4: Reporting on Updated Schedule

Student Learning Objectives

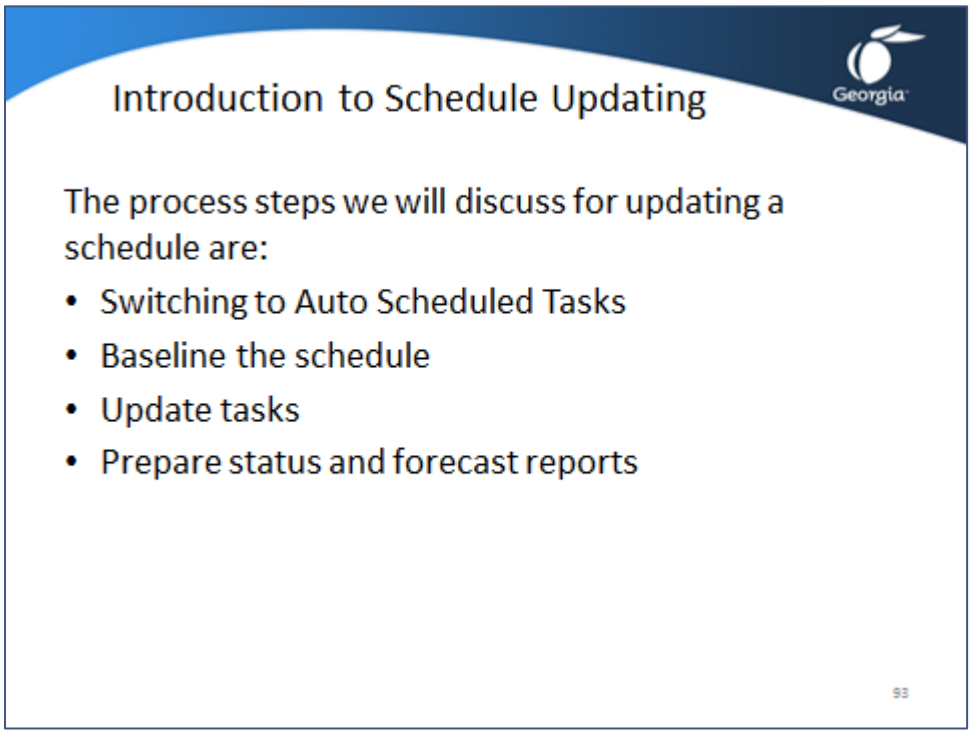
After completing this lesson you should be able to

- Understand how to prepare your schedule for updating
- Understand how to set and maintain the project baseline
- Understand how to update task using actual and remaining duration

Approximate Presentation time: 1 hour 30 minutes



Topic 1: Introduction to Schedule Updating

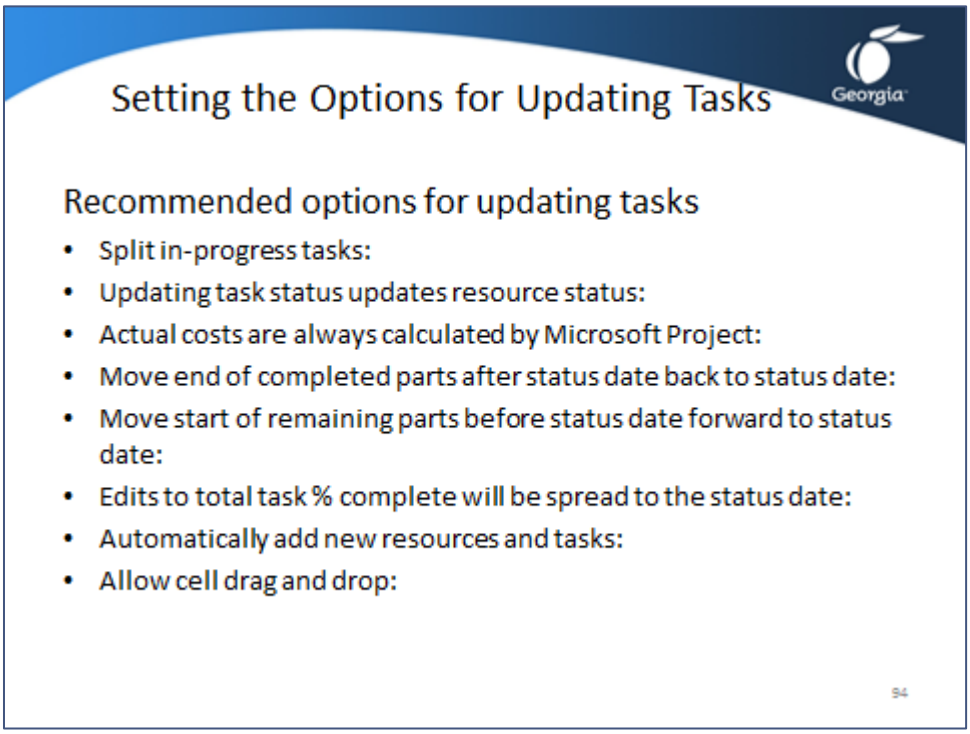


When the schedule is approved, you capture that version of the baseline. You can then start the first tasks in your project. As team members make progress, you will be updating your schedule regularly to maintain an up-to-date schedule. In this lesson we will discuss how you can approach the ideal situation where you keep your schedule alive and up-to-date during project execution in order to continuously forecast the project.

The process steps we will discuss for updating a schedule are:

- Switching to Auto Scheduled Tasks
- Baseline the schedule
- Update tasks
- Prepare status and forecast reports

Topic 1: Setting the Options for Updating Tasks



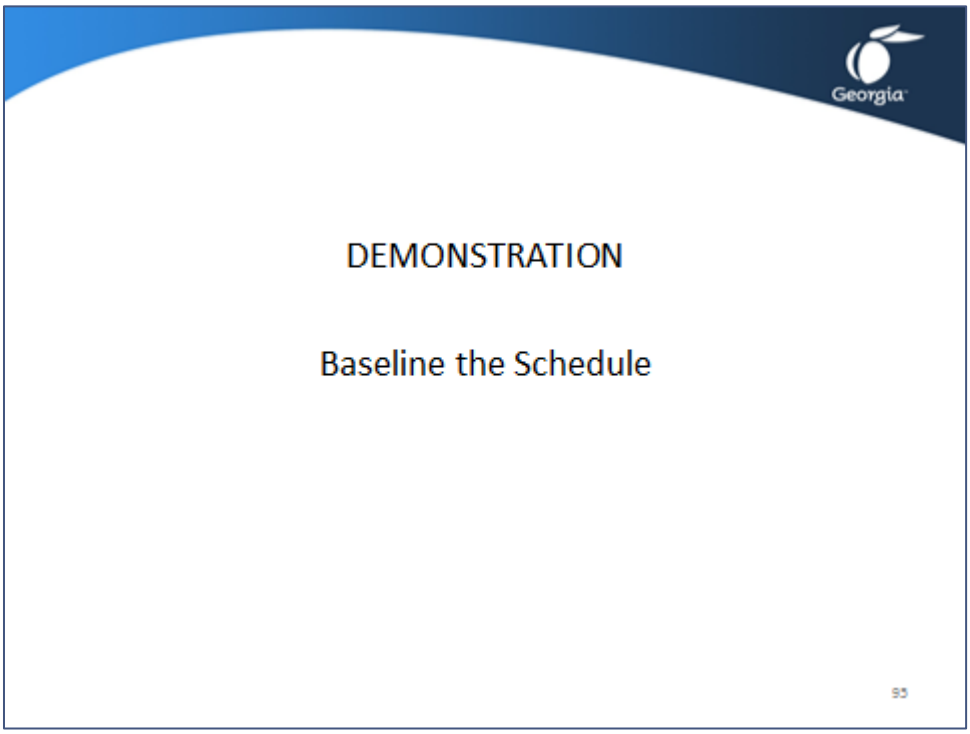
Click the ribbon **File**, **Options** and click on the tab indicated in the table below where you want to change settings. These are the recommended options when using **Actual** and **Remaining Duration** for updating tasks.

Tab	Option
Schedule	Section **Scheduling options for this project:** **Split in-progress tasks:** Checked Allows moving the uncompleted portion of a task to after the Status Date by splitting the task bar. With this option cleared, the options on the Advanced tab cannot split any task bars and will behave differently as a result. It is recommended selecting it.
	Section **Calculation options for this project:** **Updating task status updates resource status:** Checked Updating the tasks will update the actual work of the assignments. It is recommended you keep this option checked for task updates. Only clear it if you want to update the tasks and the assignments.
	Section **Calculation options for this project:** **Actual costs are always calculated by Microsoft Project**: either checked or unchecked Updating the tasks will update the *actual cost*. It is up to you whether you want MS Project to do that. If you clear this option, you can enter the actual cost.
Advanced	Section **Calculation options for this project:** **Move end of completed parts after status date back to status date:** Checked This moves the actual duration bar to before the status date; actual work done is

Tab	Option
	moved into the past. It is recommended you turn this on; it will help you keep the forecasts accurate. **And move start of remaining parts back to status date:** Checked The remaining duration bar will cuddle up to the status date (unless there are dependencies that keep it where it is). The choice is up to you.
	Move start of remaining parts before status date forward to status date: Checked This moves the remaining duration bar to after the status date; work still to be completed is moved to the future. It is recommended you turn this on; it will help you keep the forecasts accurate. It has no effect on tasks that have not started yet, but should have started as per the status date. These tasks will still have to be rescheduled to after the status date to put them into the future where they belong. **And move end of completed parts forward to status date:** Checked or Unchecked This moves the actual duration bar to cuddle up to the status date. The choice is yours.
	Edits to total task % complete will be spread to the status date: Unchecked If a task is falling behind, the progress entered will be evenly spread to the status date. This option is only relevant if you enter % Complete, which is not recommended.
	Section **General options for this project:** **Automatically add new resources and tasks:** Unchecked This prevents a typo in a resource name from accidentally adding a new resource, and works similarly for tasks. It is recommended clearing it.
	Section **Edit:** **Allow cell drag and drop:** Unchecked This prevents accidentally dragging data on top of other data in your baselined schedule. It is recommended to clear this option.

It is recommended that you switch all tasks in your schedule to Auto Scheduled at this point. You will not see the impacts of your updating if you continue to use *manually scheduled* tasks. They are not rescheduled by the network logic.

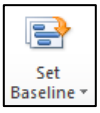
Topic 2: Baseline the Schedule



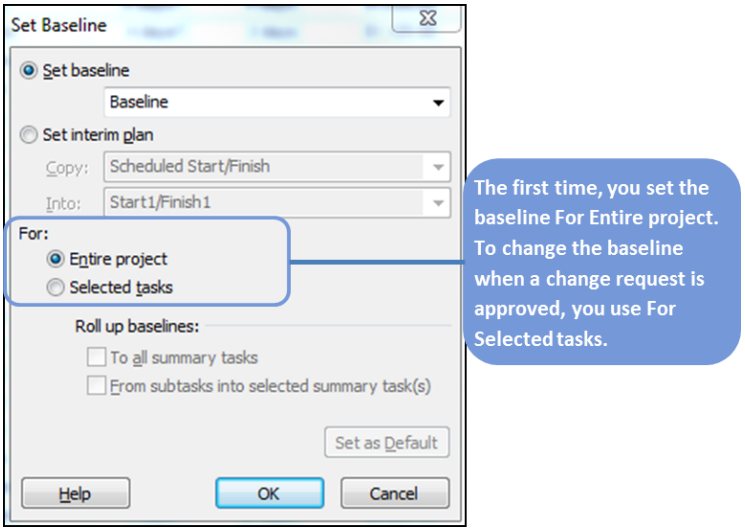
The baseline schedule is a frozen copy of the approved schedule. It is the target you work towards and compare progress against.

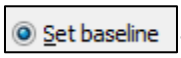
Open the demonstration file **Demo Lesson 9 Updating 1**.

Setting the First Baseline Schedule

1. Click ribbon **Project**, 

, item **Set Baseline** – the next dialog appears:



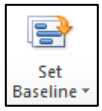
2. Select 

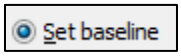
.
3. To set the baseline for all tasks, select 

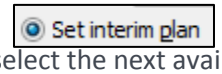
.
4. Click **OK** – the current schedule is copied to the **Baseline** fields.
5. If you suspect that you will receive change requests that will result in multiple baselines, it is a good idea to preserve the current baseline by copying it also into **Baseline1**.

Preserving a Baseline Schedule

Change requests will necessitate changing the baseline. It is a good idea to preserve every steady-state baseline that was in effect at some time. You can preserve up to 10 baselines.

1. Click ribbon **Project**, 

, item **Set baseline**; the **Set Baseline** dialog box appears.
2. Check what the next available baseline is in the 

list; baselines that are currently in use have a date behind their name in the pull-down list.
3. Select 

and, from the list **Copy**, select the current **Baseline** and, from the list **Into**, select the next available baseline schedule.
4. Click **OK** – that day's date is captured in the name of the baseline schedule you used. This will help you manage multiple baselines.

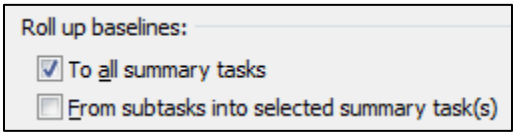
Updating the Baseline of Impacted Tasks

The baseline data of completed tasks should never be changed. Only tasks that have not been started yet and that are affected by change requests through dependencies can be re-baselined.

1. Click ribbon **Project**, 

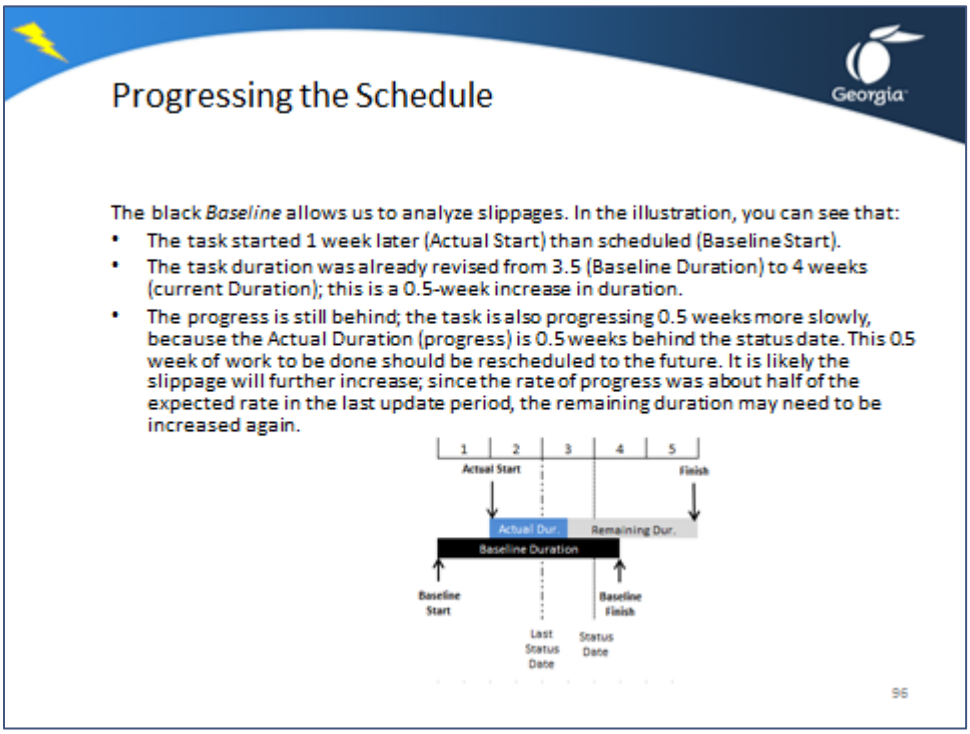
, item **Set baseline**; the **Set Baseline** dialog box appears.
2. Select the option **For:** 

.
3. **Roll up baselines** options should look like:

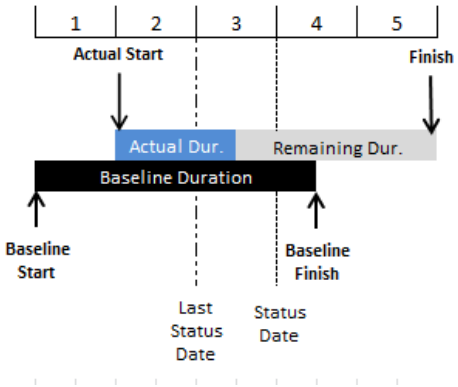


4. Click **OK**
5. Preserve the new **Baseline**.

Topic 3: Progressing the Schedule and Updating Tasks



The progress of the schedule can best be seen in the **Tracking Gantt** view. This view shows the task bars as shown in the illustration. The scheduled task will slowly but surely fill in with solid dark blue/red (*Actual*) to indicate how much progress has been made: field *Actual Duration*. Notice that the actual duration represents the number of days a team member has worked on the task so far – even though many people only think of it as the number of days the task took once it is completed.



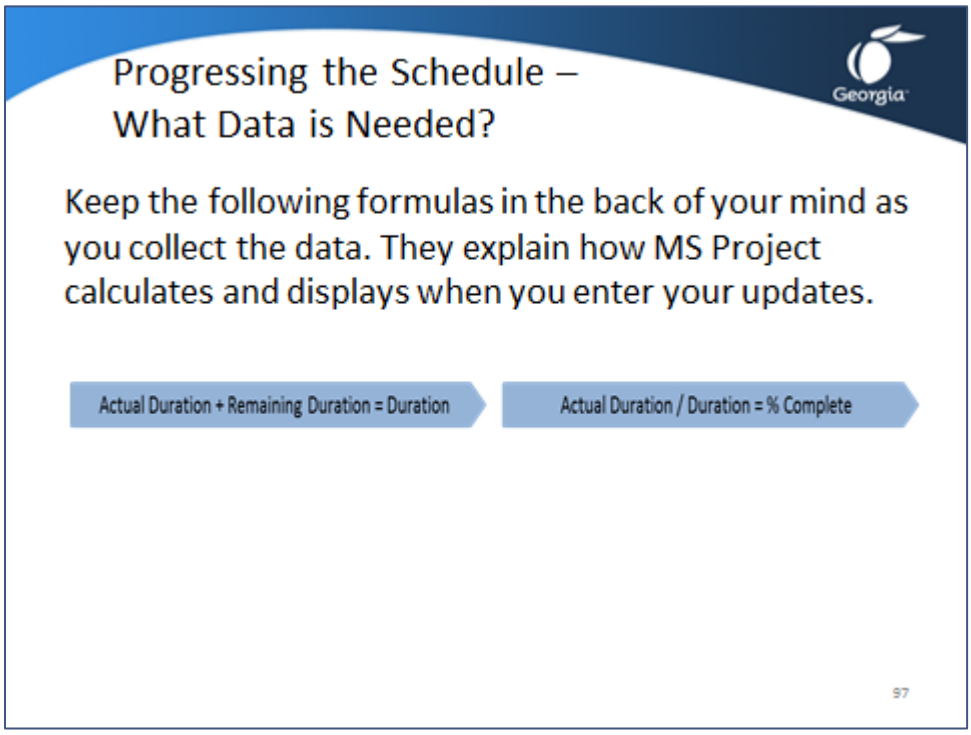
Ideally, the actual duration runs up to the *status date*, indicating that the task is progressing as scheduled. In the illustration you can see that the progress (*Actual Dur.*) has fallen behind. The rest of the bar represents the *Remaining Duration*. The remaining duration is how many days the task will take from the current status date to completion. Actual Duration plus Remaining Duration equals Duration.

The black *Baseline* allows us to analyze slippages. In the illustration, you can see that:

1. The task started 1 week later (Actual Start) than scheduled (Baseline Start).
2. The task duration was already revised from 3.5 (Baseline Duration) to 4 weeks (current Duration); this is a 0.5-week increase in duration.
3. The progress is still behind; the task is also progressing 0.5 weeks more slowly, because the Actual Duration (progress) is 0.5 weeks behind the status date. This 0.5 week of work to be

done should be rescheduled to the future. It is likely the slippage will further increase; since the rate of progress was about half of the expected rate in the last update period, the remaining duration may need to be increased again.

Topic 3: Progressing the Schedule and Updating Tasks



What Data Should Be Collected?

Keep the following formulas in the back of your mind as you collect the data. They explain how MS Project calculates and displays when you enter your updates.

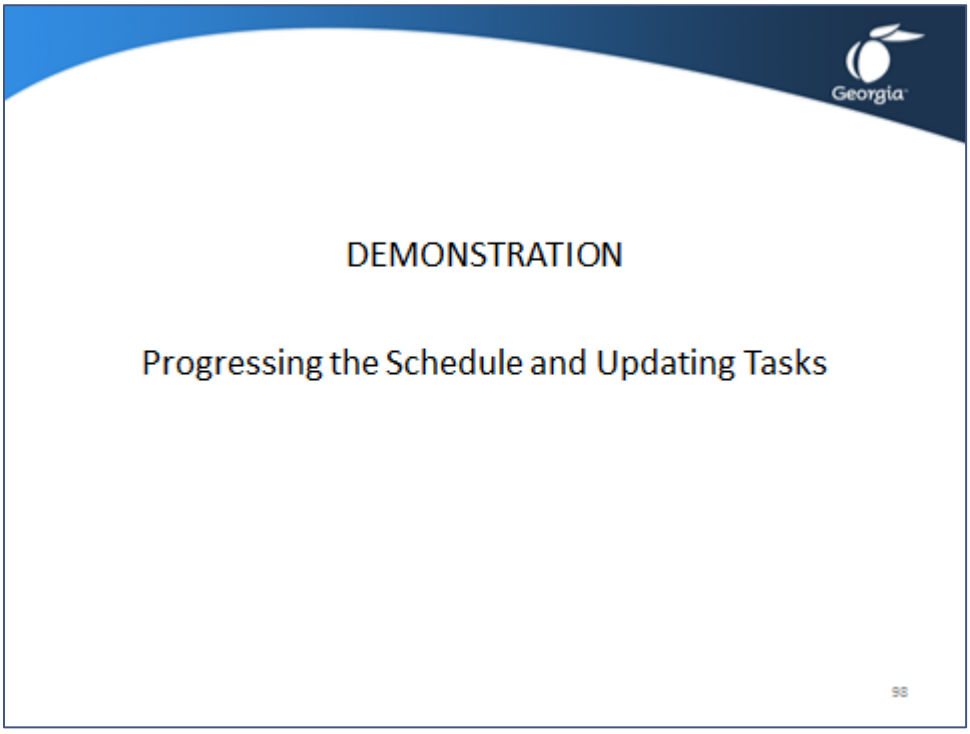
Actual Duration + Remaining Duration = Duration

Actual Duration / Duration = % Complete

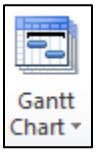
It is recommended that you collect at least the **Remaining Duration** (or **Remaining Work**) from your team, and at most the following four data points. To dos, ask the following questions:

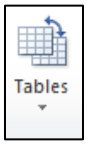
1. *On what date did you start the task?* (**Actual Start**)
2. *How many business days have you worked on the task as per the status date?* (**Actual Duration**)
3. *How many business days do you still need to finish the task after the status date?* (**Remaining Duration**)
4. *On what date was the task finished?* (**Actual Finish**)

Topic 3: Progressing the Schedule and Updating Tasks



Preparing the Tracking Gantt View for Updating

1. Open the demonstration file **Demo Lesson 9 Updating 2**.
2. Click ribbon **View**, click the bottom part of 

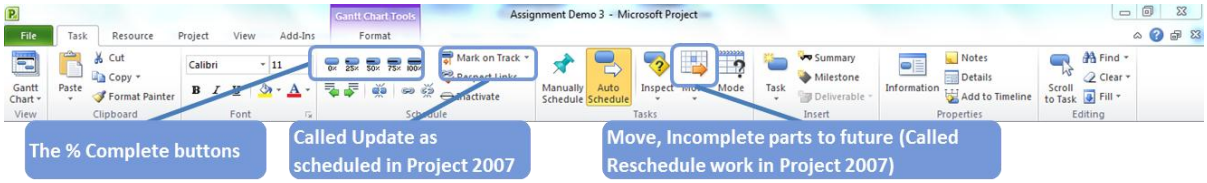
and select **Tracking Gantt** – the **Tracking Gantt** view appears. The current schedule is shown in the top half of the task bars (colored blue or red). The baseline is shown as the gray bottom half of the task bars.
3. Keep the critical task visible (ribbon **Format**, **Critical Tasks** checked).
4. Click ribbon **View**, 

and **Tracking** – the tracking table appears.
5. The tracking table has all the fields in which to enter data for task updates. It is recommended that you modify the table to make it look like the table in the following screenshot.

	Task Name	Act. Start	Act. Dur.	Rem. Dur.	Actual Finish	Act. Cost
1	**Scope**	**NA**	**0 days**	**3.5 days**	**NA**	**$0.00**
2	Determine project scope	NA	0 hrs	4 hrs	NA	$0.00
3	Secure project sponsorship	NA	0 days	1 day	NA	$0.00
4	Define preliminary resources	NA	0 days	1 day	NA	$0.00
5	Secure core resources	NA	0 days	1 day	NA	$0.00
6	Scope complete	NA	0 days	0 days	NA	$0.00
7	**Analysis/Software Requirements**	**NA**	**0 days**	**14 days**	**NA**	**$0.00**
8	Conduct needs analysis	NA	0 days	5 days	NA	$0.00
9	Draft preliminary software specifications	NA	0 days	3 days	NA	$0.00
10	Develop preliminary budget	NA	0 days	6 days	NA	$0.00

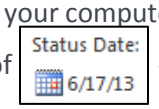
Enter actual progress and forecasts into a modified Tracking table.

6. Display the Task ribbon. The Task ribbon contains several useful tools for updating schedules.

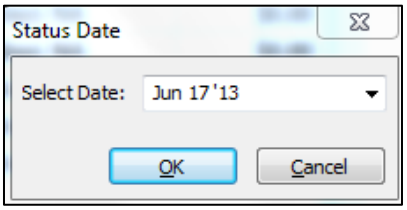


Setting the Status Date for Updating

If you do not enter the **Status Date**, Project 2010 will use the **Current Date** (that day's date) for the update. The Current Date is maintained by the clock in your computer.

1. Click the ribbon **Project** and click the bottom half of 

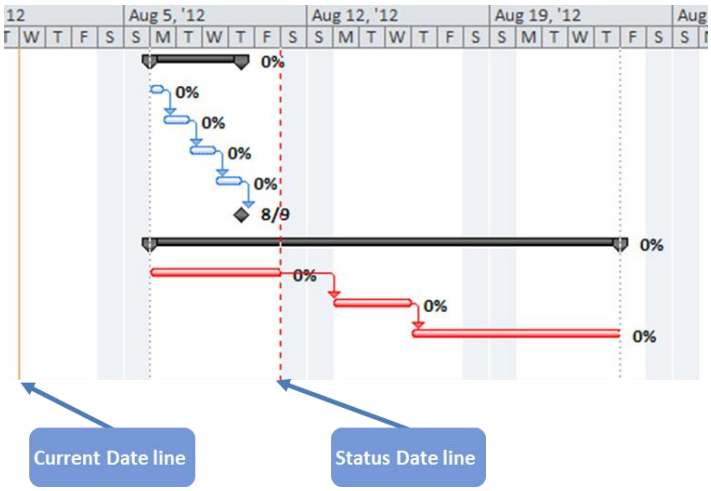
- the **Status Date** dialog appears.



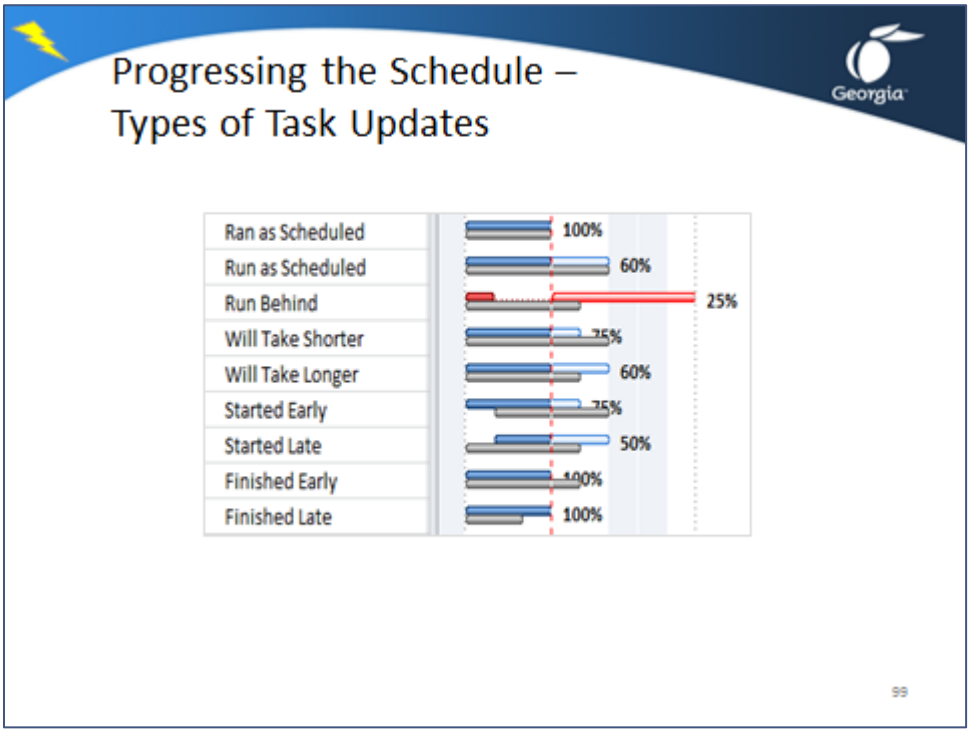
2. Change the **status date** to the date you want to update tasks and compare the schedule against the baseline.
3. The status date does not yet appear as a vertical line in the timescale. Click ribbon **Format**, 

, item **Gridlines** and select **Status Date** in the list as the line to change. Choose a dashed line in **Type** and a bright **Color**. The dashed line makes it different from dependency lines (arrows). Click **OK**.

4. The status line in now visible in the timescale, similar to:



Topic 3: Progressing the Schedule and Updating Tasks



Tasks that Ran as Scheduled

Simply mark these tasks as 100% complete in the Tracking Gantt view, as shown in the illustration.

1. Select the tasks that were completed as scheduled by dragging over them or by clicking on the first and, while holding down **Ctrl**, clicking on the rest of the tasks.
2. On the **Task** ribbon, click 

   OR in the **% Complete** field of the tracking table, enter 100%,
   OR in the **Actual Duration** field, enter a value equal to the **Remaining Duration**.

Tasks that Run as Scheduled

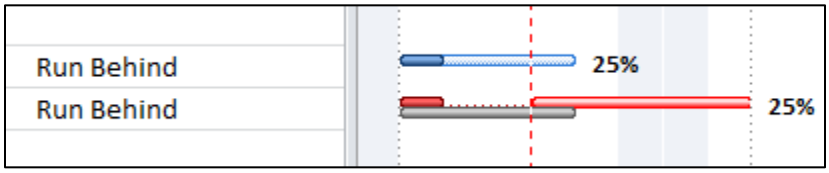
In this case you want to show actual progress up to the status date, as in the illustration.

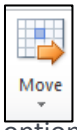
1. Select the tasks that are on schedule by dragging over them or by clicking on the first and, while holding down **Ctrl**, clicking on the rest of the tasks.
2. On the **Task** ribbon, click 

- this updates all selected tasks as if they progress on schedule as per the status date.

Tasks that Run Behind

This situation will require more updating effort. Observe the first *Run Behind* task in the illustration. You can see that the progress is falling behind because the solid color denoting actual progress does not run up to the status date in the task bar. You will need to capture the actual number of days the resource worked on the task (**Actual Duration**), but because the task is behind, you will also have to bring forward the incomplete portion of the task bar (**Remaining Duration**) to after the *status date*, as is done in the second *Run Behind* task.



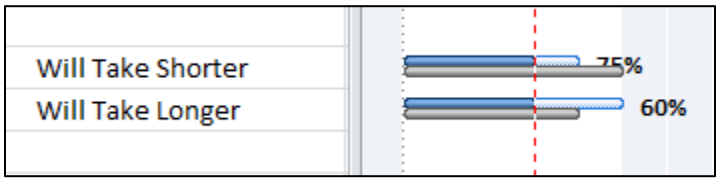
1. In the Tracking Gantt view, enter the **Actual Duration** of the task; MS Project will calculate the new remaining duration.
2. Revise this calculated **Remaining Duration** and MS Project will calculate **the % Complete**.
3. The remaining durations are automatically moved to the future if you selected **Move start of remaining parts before status date forward to status date** (in ribbon **File**, **Options**, tab **Advanced**). You can also accomplish this by:
    a. Selecting the task and clicking the **Task** ribbon, 

, and **selecting Incomplete Parts to Status Date** (This will split the task bar if the option **Split in-progress tasks** is in effect in ribbon **File**, **Options**, tab **Schedule**, section **Scheduling options for this project**).

Tasks that Will Take Longer or Shorter

In this situation, the resource(s) worked all the days on the task as planned, but the realization sinks in that the remaining duration will not suffice; the task was either overestimated or underestimated. You will need to increase or decrease the **Remaining Duration**.

Since you are going to change the duration, you will trigger a recalculation through the *formula* **Duration * Peak Units = Work**. You should not leave the task type set to **Fixed Duration**. It is recommended that you change the task type to **Fixed Units** before you start to update.



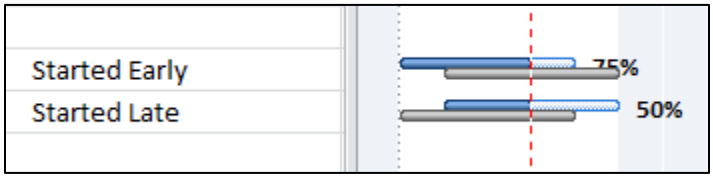
1. If needed, set the Type of task to *Fixed Units*.
2. Click the Mark on Track button on the **Task** ribbon

   OR

   Enter an **Actual Duration** for the task equal to the number of working days between the start of the task and the status date. As a result, the status bar now runs up to the status date.
3. Revise the **Remaining Duration** for the task.

Tasks that Started Late or Early

In this situation, the task did not start on the day that was planned. The illustration below reveals that the bottom task started late, whereas the top task started early. In the Late situation, the actual start date (left side of the top bar) is later than the baseline start date (the left side of its gray bottom bar).



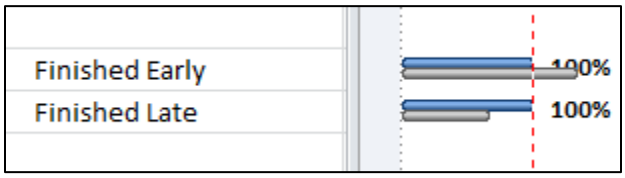
1. In the Tracking Gantt view, point to the middle of the blue task bar; when you see a four-headed arrow mouse pointer, drag the task bar to its new start date.

   OR

   In the **Actual Start** field of the tracking table, enter the date.
2. Click the Mark on Track button on the **Task** ribbon – progress now runs up to the status date.

Tasks that Finished Late or Early

In this situation, you need to enter the finish dates. In the illustration below, you can see that the bottom task finished late relative to the gray baseline bar. The top task finished early.

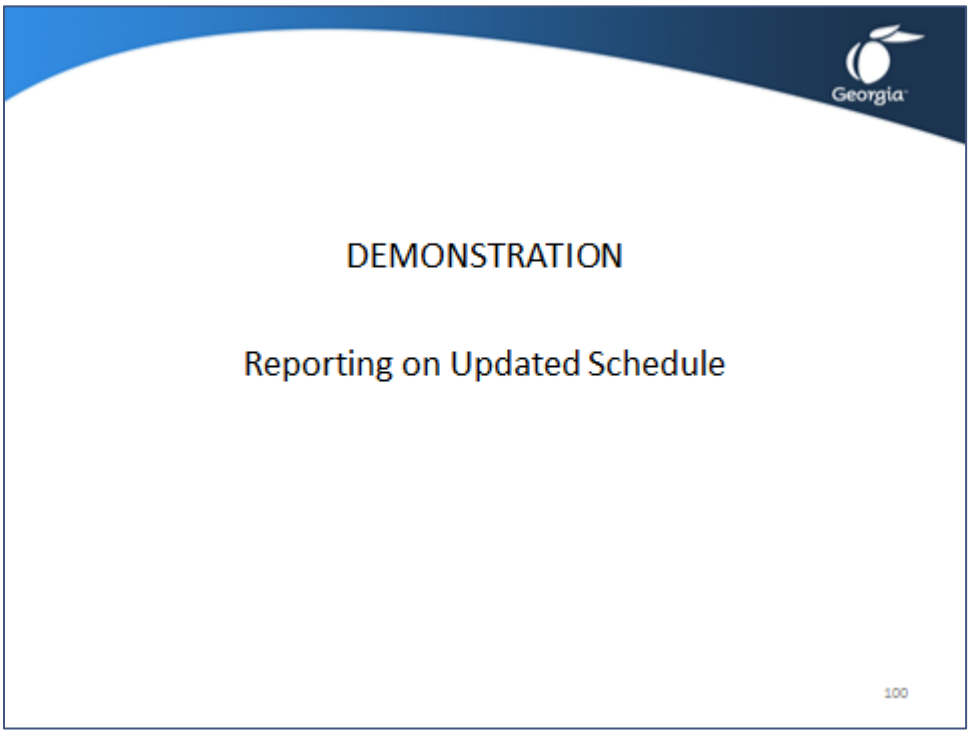


1. In the Tracking Gantt view, point to the right side of the blue or red task bar and when you see a single-headed arrow mouse pointer, drag the finish to its new date. Set the task to 100% complete; click 100% on the Task ribbon.

   OR

   In the **Actual Finish** field of the tracking table, enter the date.

Topic 4: Reporting on Updated Schedule



Open the demonstration file **Demo Lesson 9 Updating 3**.

Executives sometimes ask for reports that only show the differnces since the last update. To create such a report, you need to take a snapshot immediately after each schedule update:

1. Save all start and finish dates by setting an interim plan before entering any update information: click ribbon **Project**, button **Set Baseline**, item **Set Baseline** – the dialog appears.
2. Select **Set interim plan** and **Entire project**. Click **OK**.

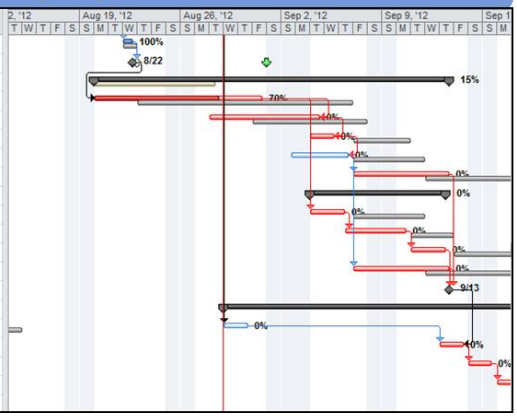
Taking this step immediately after each update is better than just before the next update, because it catches any changes in the schedule other than the changes resulting from updating the schedule.

To create this report:

1. Enter the task update information and apply the custom view *Tracking Gantt delta since last update*. The report should look similar to the screenshot below. How this view was created will be demonstrated in the next lesson. **Note: creating custom tables, views, and filters will be covered in more detail in the second MS Project course.**

The project manager updated the schedule, and the view bolded all tasks that were affected by the update.

	Task Name	Baseline Start	Start before	Start after	Baseline Finish	Finish before	Finish after
15	negotiate the contract	Aug 22 '12	Aug 22 '12	Aug 22 '12	Aug 22 '12	Aug 22 '12	Aug 22 '12
16	contractor contracted	Aug 22 '12	Aug 22 '12	Aug 22 '12	Aug 22 '12	Aug 22 '12	Aug 22 '12
17	**REMODELED LOCATION**	**Aug 23 '12**	**Aug 20 '12**	**Sep 13 '12**	**Sep 18 '12**	**Sep 13 '12**	**Sep 13 '12**
18	relocate walls	Aug 23 '12	Aug 20 '12	Aug 31 '12	Sep 6 '12	Aug 31 '12	Aug 31 '12
19	install electric wiring	Aug 31 '12	Aug 28 '12	Sep 4 '12	Sep 7 '12	Sep 4 '12	Sep 4 '12
20	paint	Sep 7 '12	Sep 4 '12	Sep 5 '12	Sep 10 '12	Sep 5 '12	Sep 5 '12
21	drying of paint	Sep 7 '12	Sep 2 '12	Sep 6 '12	Sep 11 '12	Sep 6 '12	Sep 6 '12
22	install cabinetry	Sep 12 '12	Sep 7 '12	Sep 13 '12	Sep 18 '12	Sep 13 '12	Sep 13 '12
23	**install LAN**	**Sep 7 '12**	**Sep 4 '12**	**Sep 13 '12**	**Sep 18 '12**	**Sep 13 '12**	**Sep 13 '12**
24	install LAN cables	Sep 7 '12	Sep 4 '12	Sep 6 '12	Sep 11 '12	Sep 6 '12	Sep 6 '12
25	install LAN hardware	Sep 11 '12	Sep 6 '12	Sep 10 '12	Sep 13 '12	Sep 10 '12	Sep 10 '12
26	install LAN operating system	Sep 14 '12	Sep 11 '12	Sep 13 '12	Sep 18 '12	Sep 13 '12	Sep 13 '12
27	lay carpet	Sep 12 '12	Sep 7 '12	Sep 13 '12	Sep 18 '12	Sep 13 '12	Sep 13 '12
28	facility remodelled	Sep 18 '12	Sep 13 '12	Sep 13 '12	Sep 18 '12	Sep 13 '12	Sep 13 '12
29	**MOVE**	**Aug 10 '12**	**Aug 29 '12**	**Sep 18 '12**	**Sep 25 '12**	**Sep 18 '12**	**Sep 18 '12**
30	select mover	Aug 10 '12	Aug 29 '12	Aug 30 '12	Aug 14 '12	Aug 30 '12	Aug 30 '12
31	pack	Sep 20 '12	Sep 13 '12	Sep 14 '12	Sep 21 '12	Sep 14 '12	Sep 14 '12
32	move	Sep 22 '12	Sep 15 '12	Sep 16 '12	Sep 23 '12	Sep 16 '12	Sep 16 '12
33	unpack	Sep 24 '12	Sep 17 '12	Sep 18 '12	Sep 25 '12	Sep 18 '12	Sep 18 '12
34	new location opened	Sep 25 '12	Sep 18 '12	Sep 18 '12	Sep 25 '12	Sep 18 '12	Sep 18 '12



Exercise 9.1: Updating the Schedule for the Relocation Project – First Update

Instructions:

The goal of this exercise is to be able to update a schedule and to get accurate forecasts.

Continue to work with your file *Relocation.mpp* or open *Exercise 9A.mpp*. We will manage our project with this schedule and update it as we go along. Change to the **Tracking Gantt** view.

1. Click ribbon **View**, button **Table,** item **Tracking** to apply the Tracking table. Remove the column **% Comp.** and the **Phys. % Comp.** Move the column **Act. Finish** to after **Rem. Dur.** The order of the columns is the order in which to enter update information and is a memory bridge for updating.
2. Using ribbon **Project**, button **Set baseline**, item **Set baseline…** - set the baseline for the entire project.
3. Click ribbon **Project** and set the **Status Date** to *August 28, 2012 5:00 p.m.* and create a gridline for the status date in the Tracking Gantt timescale using ribbon **Format**, button **Gridlines**, item **Gridlines…**
4. Set the following options in ribbon **File**, **Options**, tab **Schedule**:
    a. **Updating task status updates resource status** is checked
    b. **Actual costs are always calculated by Project** is checked
5. Set the following options in ribbon **File**, **Options**, tab **Advanced**:
    a. **Move end of completed parts after status date back to status date** is checked
    b. **Move start of remaining parts before status date forward to status date** is checked
6. Switch the task type to **Fixed Units** and not **Effort-Driven** for all tasks.
7. Update the tasks in the project schedule. As of the status date the situation is:
    a. All the tasks until Contractor Contracted ran as scheduled.
    b. The contractor started early because he finished his previous contract early. He supplied the following update on the first and only task he started: relocate walls:

Task	Started	Actual Duration	Remaining Duration
Relocate walls	August 20, 2012	7 days	3 days

8. Check whether the schedule is updated correctly:
    a. Check whether there are any remaining durations scheduled before the status date. Reschedule these after the status date.
    b. Check if there are actual durations after the status date and reschedule these before the status date.
9. Describe the status of project in your own words.
10. Do you need to take corrective actions?
11. Save all start and finish dates by setting an interim plan before entering any update information: click ribbon **Project**, button **Set Baseline**, item **Set Baseline** – the dialog appears. Select **Set interim plan** and **Entire project**. Click **OK**.
12. Save your file and compare it with the solution *Exercise 9B.mpp*.

Re-optimizing After First Update

Instructions:
The goal of this exercise is to be able to improve a schedule so that it is closer to its baseline schedule again.

Continue to work with your file *Relocation.mpp* or open *Exercise 9B.mpp*. You find that your project may run late relative to the baseline. You want to take corrective action by making the following changes in your schedule.

Task name	Action
Relocate walls	Change the task type back to **Fixed Work**, then change the number of units to 15 for the balance of the activity: add 5 resources to help complete the activity. The result is a gain of 1 day.
Install electrical wiring	Enter an **Ovt. Rate** for the Contractor of $45 per hour (150%). Change the task type back to Fixed Work, then change the number of units to 8 for the activity. Have the resources work overtime to a total of 32 overtime hours. The duration shortens to almost 2.6 days.
Install cabinetry	Delete the dependency from *drying of paint* to *install cabinetry* and replace it with a dependency from *paint* to *install cabinetry*. *Install cabinetry* should be on schedule.
Install LAN cables	Change the dependency from *relocate walls* to *install LAN cables* to Finish-to-Finish with a 1.5 day lag. The *Install the LAN* activities should be on schedule.

Save your file and compare it with the solution *Exercise 9C.mpp*.

Exercise 9.2: Updating the Schedule for the Relocation Project – Second Update

Instructions:

The goal of this exercise is to be able to update a schedule and to get accurate forecasts.

Continue to work with your file *Relocation.mpp* or open *Exercise 9C.mpp*.

1. If needed, do the following:
    a. Display the Tracking Gantt view.
    b. Apply the Tracking table. Remove the columns **% Comp.** and the **Phys. % Comp.** Move the column **Act. Finish** to after **Rem. Dur.**
2. On the **Project** ribbon, set the **Status Date** to *September 4, 2012* and, if needed, create a gridline (ribbon **Format**, button **Gridlines**, item **Gridlines…**) for the status date in the Tracking Gantt timescale.
3. Verify if the following options are set:
   In ribbon **File**, **Options**, tab **Schedule**:
   Updating Task status updates resource status (checked)
   Actual costs are always calculated by Microsoft Project (checked)

   In ribbon **File**, **Options**, tab **Advanced**:
   Move end of completed parts after status date back to status date (checked)
   Move start of remaining parts before status date forward to status date (checked)
4. Switch the task type to **Fixed Units** and not **Effort-Driven** for the tasks needing update.
5. Update the tasks in the project schedule. The contractor supplied the following table with update data for the status of the project as of the status date. Tasks that are not listed in the table have not started yet.

Task Name	Actual Start	Act. Duration	Rem. Duration
Relocate walls	Aug 20, 2012	9 days	0 days
Install electric wiring	Aug 31, 2012	2.6 days	0 days
Paint	Sep 2, 2012	2 days	0 days
Drying of paint	Sep 2, 2012	2 elapsed days	0 elapsed days
Install cabinetry	Sep 4, 2012	1 day	4 days
Install LAN cables	Sep 1, 2012	2.5 days	0 days
Install LAN hardware	Sep 3, 2012	1.5 days	1 day
Select mover	Aug 31, 2012	2 days	0 days

6. Check whether the schedule is updated correctly:
    a. Check whether there are any remaining durations scheduled before the status date. Reschedule these after the status date.
    b. Check if there are actual durations after the status date and reschedule these before the status date.
7. Describe the status of project in your own words.
8. Do you need to take corrective actions?

9. Save all start and finish dates by setting an interim plan before entering any update information: click ribbon **Project**, button **Set Baseline**, item **Set Baseline** – the dialog appears. Select **Set interim plan** and **Entire project**. Click **OK**.
10. Save your file and compare it with the solution *Exercise 9D.mpp*.

Re-optimizing After Second Update

Instructions:
The goal of this exercise is to be able to improve a schedule so that it meets its baseline finish date.

Continue to work with your file *Relocation.mpp* or open *Exercise 9D.mpp*. You find this current schedule too risky; there is little buffer left. You decide to explore whether working overtime offers solutions. Enter the following overtime rates in the Resource Sheet:

Name	Std. Rate	Overtime Rate
employees	$25/h	$50/h
contractor	$30/h	$50/h
LAN consultants	$75/h	$100/h
realtor	$35/h	$45/h

1. What is the cost of the project currently? The cost is ……
2. You will enter overtime on the task lay carpet. You promised to pay the contractor the overtime rate. The contractor has agreed to work overtime for the balance of the activity. Schedule 90 hours of overtime on this task as overtime.
3. How much does your project cost if you pay the overtime rate for the contractor?

   The cost is …….. The extra cost of the overtime is: …….

Save your file and compare it with the solution *Exercise 9E.mpp*.

Exercise 9.3: Updating the Schedule for the Relocation Project – Third Update (Optional)

Instructions:

The goal of this exercise is to be able to update a schedule and to get accurate forecasts.

Continue to work with your file *Relocation.mpp* or open *Exercise 9E.mpp*.

1. If needed, do the following:
    a. Display the Tracking Gantt view.
    b. Apply the Tracking table. Remove the columns **% Comp.** and the **Phys. % Comp.** Move the column **Act. Finish** to after **Rem. Dur.**
2. On the **Project** ribbon, set the **Status Date** to *September 11, 2012* and, if needed, create a gridline (ribbon **Format**, button **Gridlines**, item **Gridlines…**) for the status date in the Tracking Gantt timescale.
3. Verify if the following options are set:

    In ribbon **File**, **Options**, tab **Schedule**:
    Updating Task status updates resource status (checked)
    Actual costs are always calculated by Microsoft Project (checked)

    In ribbon **File**, **Options**, tab **Advanced**:
    Move end of completed parts after status date back to status date (checked)
    Move start of remaining parts before status date forward to status date (checked)
4. If needed, switch the task type to **Fixed Units** and not **Effort-Driven** for the tasks needing update.
5. Your executives requested that you provide a report that displays the exact impact of this third update relative to the second update. Please follow the steps from Topic 4 to create this report.
6. Update the tasks in the project schedule. The contractor supplied the following table with update data for the status of the project as of the status date. Tasks that are not listed in the table have not started yet.

Task Name	Actual Start	Act. Duration	Rem. Duration
Install cabinetry	Sep 4, 2012	5 days	0 days
Install LAN hardware	Sep 3, 2012	2.5 days	0 days
Install LAN operating system	Sep 9, 2012	2.5 days	0 days
Lay carpet	Sep 8, 2012	4 days	0 days
Facility remodeled	Sep 11, 2012	0 days	0 days
Pack	Sep 10, 2012	2 days	0 days

7. Check whether the schedule is updated correctly:
    a. Check whether there are any remaining durations scheduled before the status date. Reschedule these after the status date.
    b. Check if there are actual durations after the status date and reschedule these before the status date.
8. Describe the status of project in your own words.

9. Do you need to take corrective actions?
10. Save all start and finish dates by setting an interim plan before entering any update information: click ribbon **Project**, button **Set Baseline**, item **Set Baseline** – the dialog appears. Select **Set interim plan** and **Entire project**. Click **OK**.
11. Save your file and compare it with the solution *Exercise 9F.mpp*.

Lesson 9 Checklist: Best Practices for Updating the Schedule

- Is the baseline schedule present, complete, correct, relevant, and challenging?
- Are the appropriate options selected in ribbon **File**, **Options** for the chosen updating strategy?
- Is the **Status Date** set to an appropriate date?
- Is the task type for soon-to-be-updated tasks set to **Fixed Units** and **not Effort-Driven**?
- Are all actual durations scheduled in the past when they actually happened?
- Are all remaining durations scheduled in the future when they will happen?

Notes

LESSON 10: REPORTS

Topic 1: Types of Reports

Topic 2: Using Visual Reports

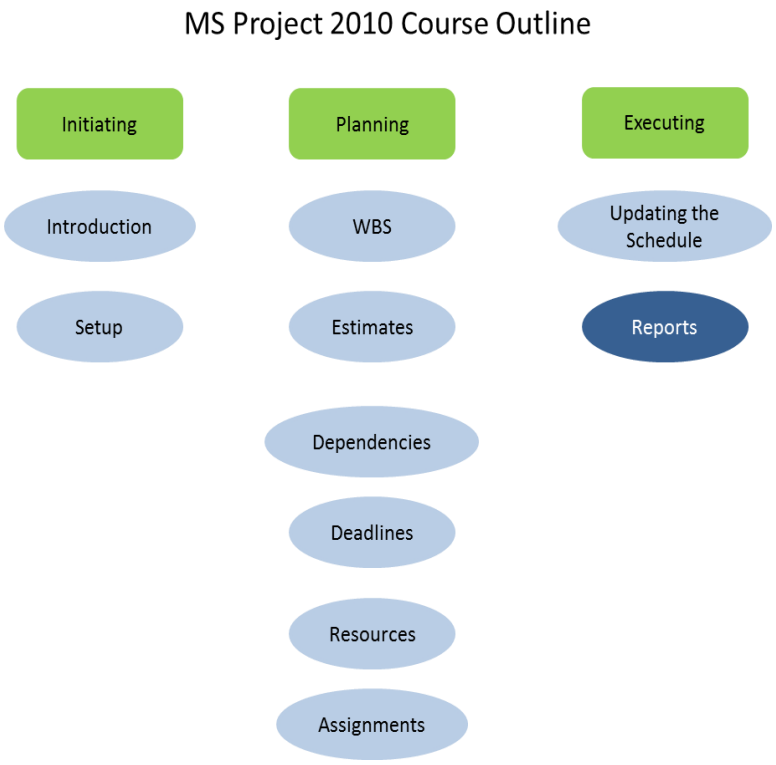
Topic 3: Creating simple reports (Views)

Student Learning Objectives

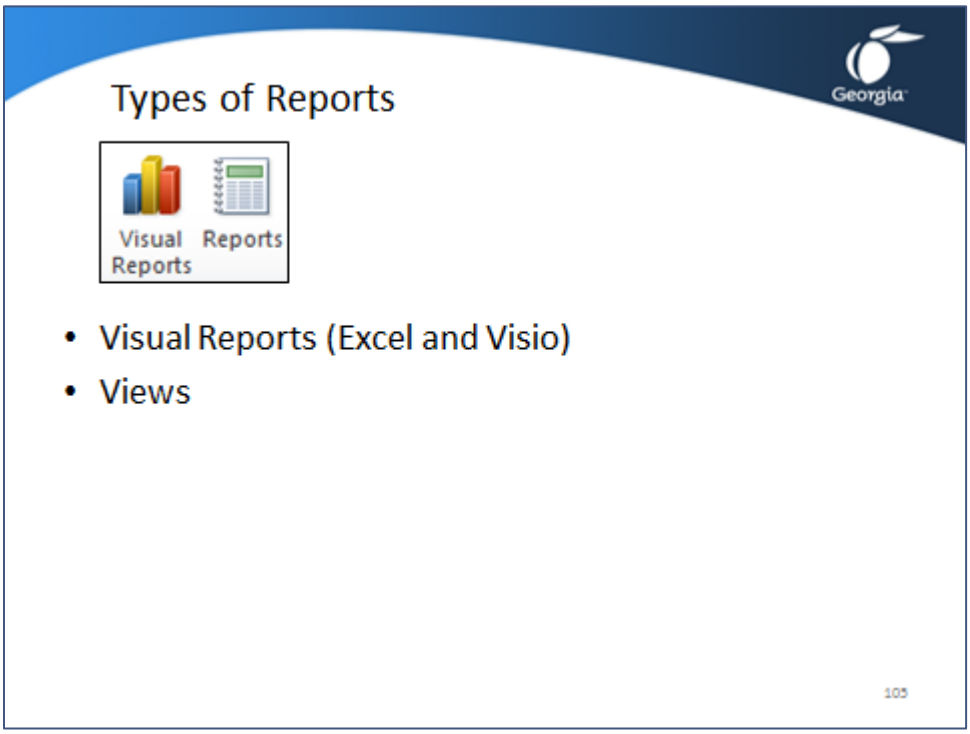
After completing this lesson you should be able to

- Understand the standard reports in MS Project
- Understand how to format, lay out and print a schedule
- Understand how to create simple reports and use the Organizer

Approximate Presentation time: 45 minutes



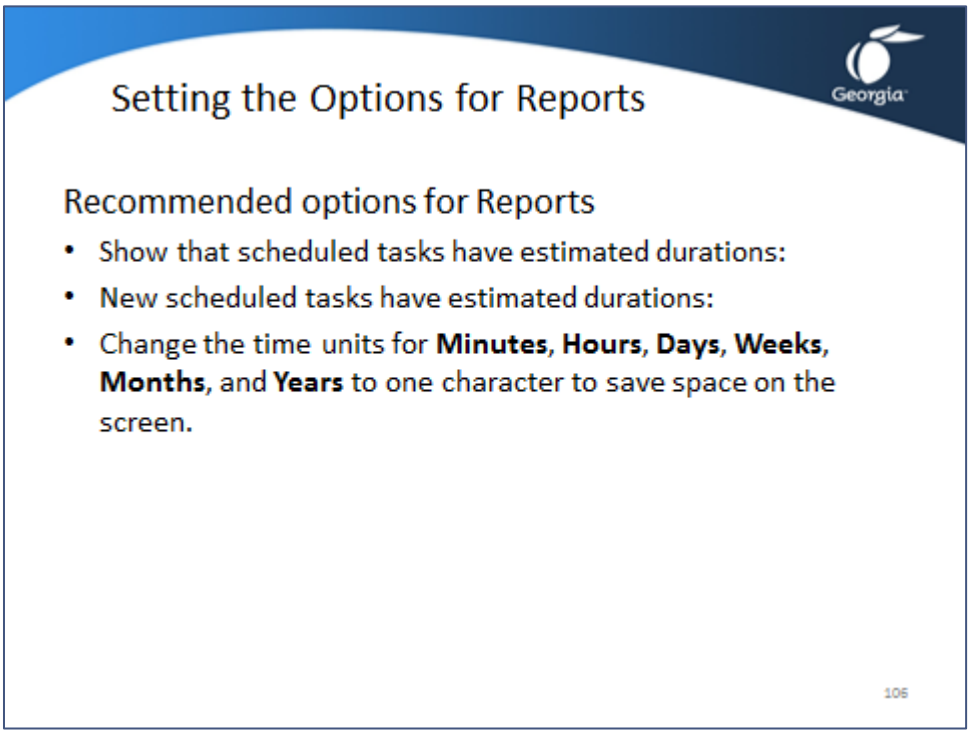
Topic 1: Types of Reports



The word *report* refers to a specific feature in MS Project (i.e. ribbon **Project**, item **Reports**, button **Reports**). All reports are table-like, with precise, numeric information. There are different ways to generate reports in MS Project:

- Visual Reports:
  These include Excel pivot tables and pivot charts, and Viso pivot diagrams.
- Views:
  A view is what you see on the screen when you apply a view from the **View** ribbon. When you print a view, it will show on paper whatever you created on the screen. You can print any view except the form views.

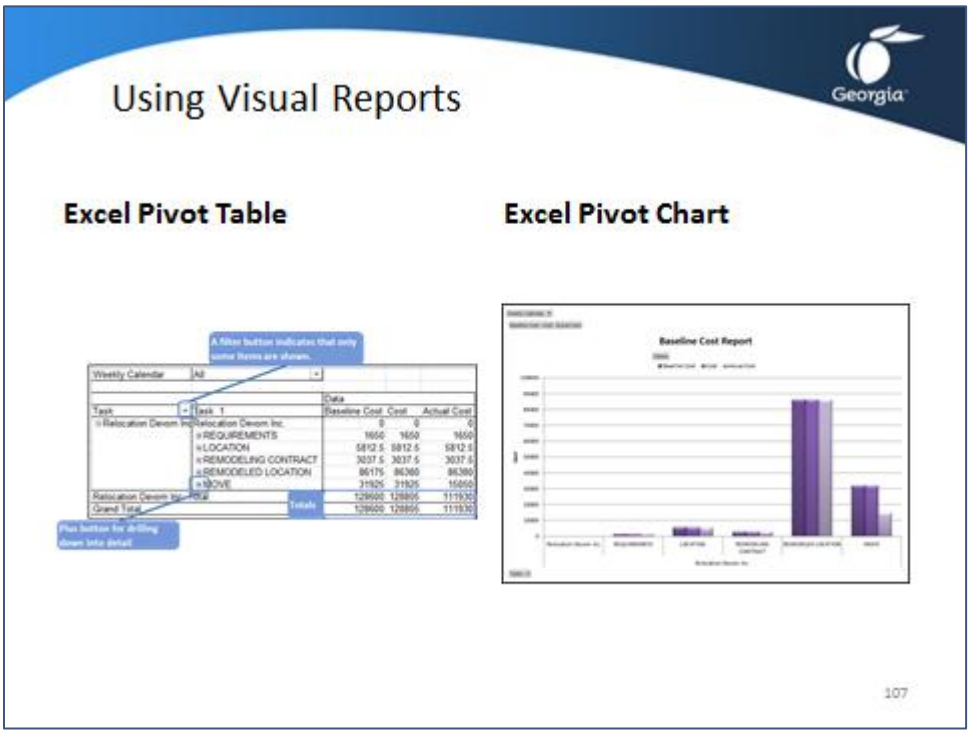
Topic 1: Setting the Options for Reporting



Click the ribbon **File**, **Options** and click on the tab indicated in the table below where you want to change settings.

Tab	Option
Schedule	Section **Scheduling options for this project:** **Show that scheduled tasks have estimated durations:** Unchecked Clear this if you want to hide the question marks in the duration field.
	Section **Scheduling options for this project:** **New scheduled tasks have estimated durations:** Unchecked Clear this if you want to hide the question marks in the duration field.
Advanced	Section **Display options for this project:** You can change the time units for **Minutes**, **Hours**, **Days**, **Weeks**, **Months**, and **Years** to one character to save space on the screen.

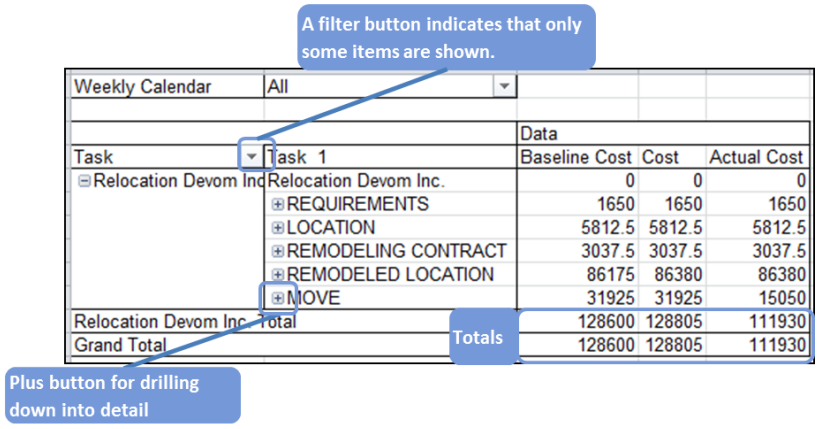
Topic 2: Using Visual Reports



There are three types of visual reporting in MS Project; *pivot tables* and *pivot charts* in Excel 2010, and *pivot diagrams* in Visio 2010.

Pivot Tables in MS Excel

The strength of the pivot table is to slice and dice data and to drill down into the details and back out to the overview. Below is an example.



Weekly Calendar	All			
		Data		
Task	Task 1	Baseline Cost	Cost	Actual Cost
⊟Relocation Devom Inc	Relocation Devom Inc.	0	0	0
	⊞REQUIREMENTS	1650	1650	1650
	⊞LOCATION	5812.5	5812.5	5812.5
	⊞REMODELING CONTRACT	3037.5	3037.5	3037.5
	⊞REMODELED LOCATION	86175	86380	86380
	⊞MOVE	31925	31925	15050
Relocation Devom Inc Total		128600	128805	111930
Grand Total		128600	128805	111930

The steps to create the pivot table are:

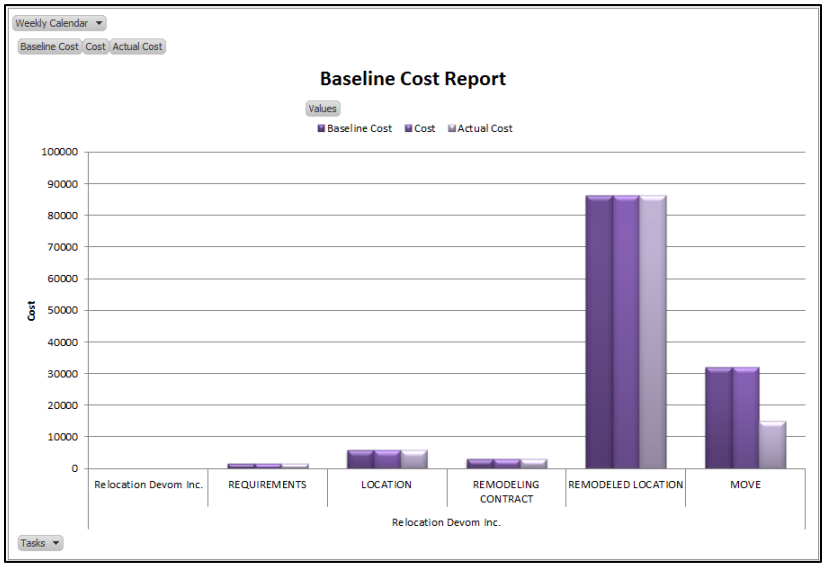
1. Click the ribbon **Project** and the button **Visual Reports**.
2. Clear **Microsoft Visio** to hide the *Visio* pivot diagrams.

3. From the list select the report you want and click **View** – the pivot chart appears in Excel.
4. To see the pivot table, click the worksheet tab **Assignment Usage** at the bottom of the screen.

You may have to further manipulate the pivot table in Excel to make it look the way you want it to.

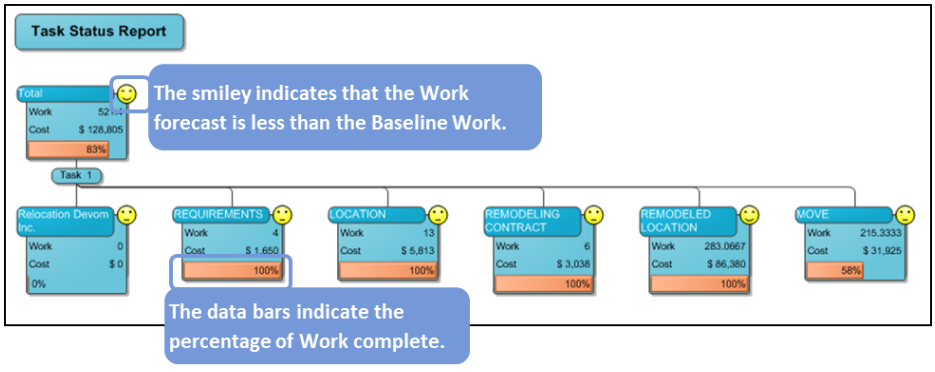
Pivot Charts in MS Excel

Excel 2010 immediately creates a pivot chart from the pivot table. An example is below:



Pivot Diagram in MS Visio

Pivot diagrams in Visio 2010 are like breakdown charts, similar to a visual WBS chart. Below is an example.

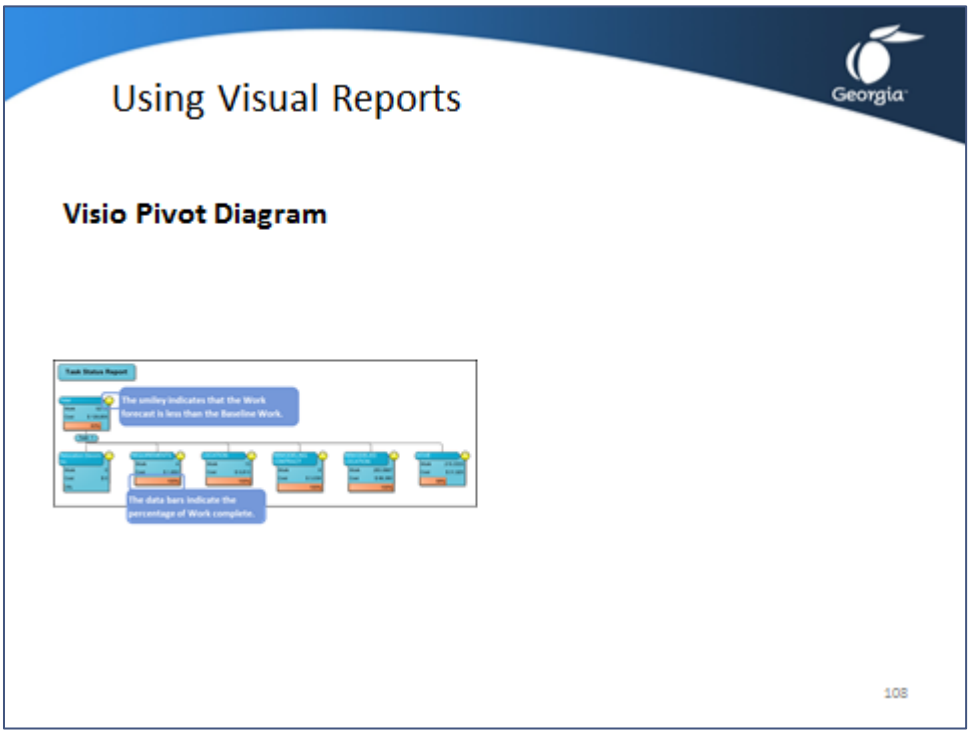


The steps to create this pivot diagram are:

1. Click ribbon **Project** and button **Visual Reports**.
2. Clear **Microsoft Excel** to hide the *Excel* pivot tables and charts.
3. From the list select the report you want and click **View** – the pivot diagram appears in Visio.

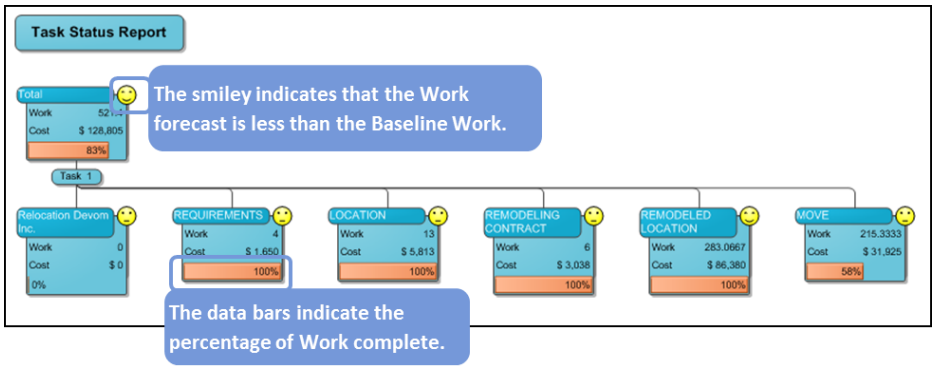
4. You may have to manipulate the chart further in Visio to make it look the way you want.

Topic 2: Using Visual Reports



Pivot Diagram in MS Visio

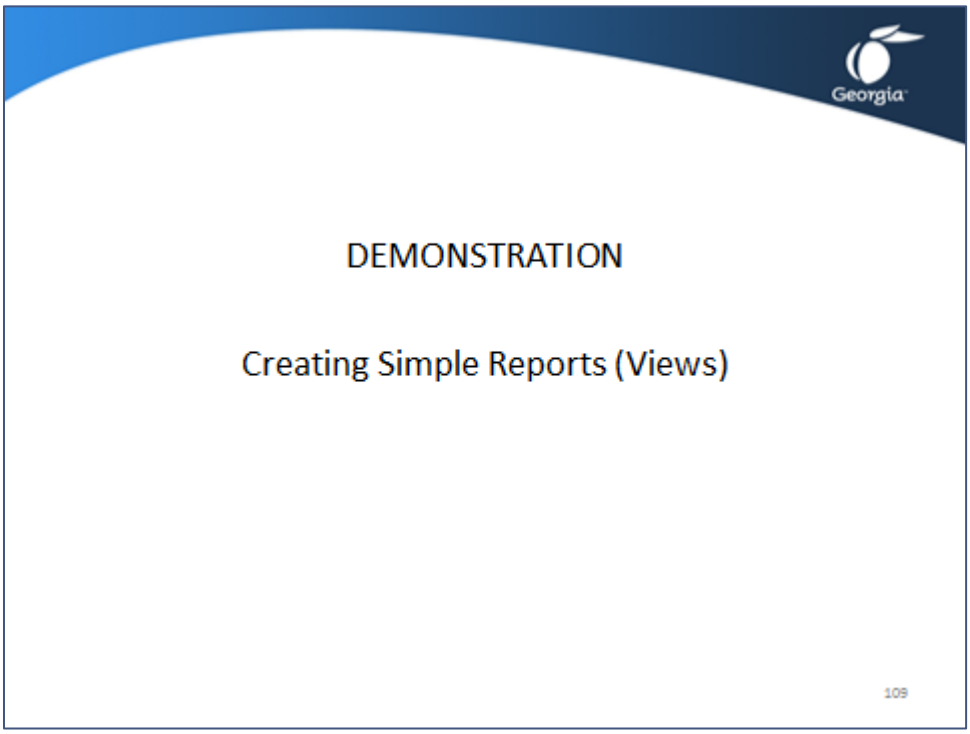
Pivot diagrams in Visio 2010 are like breakdown charts, similar to a visual WBS chart. Below is an example.



The steps to create this pivot diagram are:

5. Click ribbon **Project** and button **Visual Reports**.
6. Clear **Microsoft Excel** to hide the *Excel* pivot tables and charts.
7. From the list select the report you want and click **View** – the pivot diagram appears in Visio.
8. You may have to manipulate the chart further in Visio to make it look the way you want.

Topic 3: Creating Simple Reports (Views)

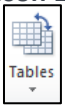


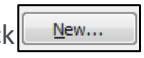
In Lesson 9 a report is displayed to compare differences in the schedule from one updating period to another. This topic will demonstrate how that view was created. The second course in MS Project will cover this exercise in more detail.

The steps we'll take to create this view are:

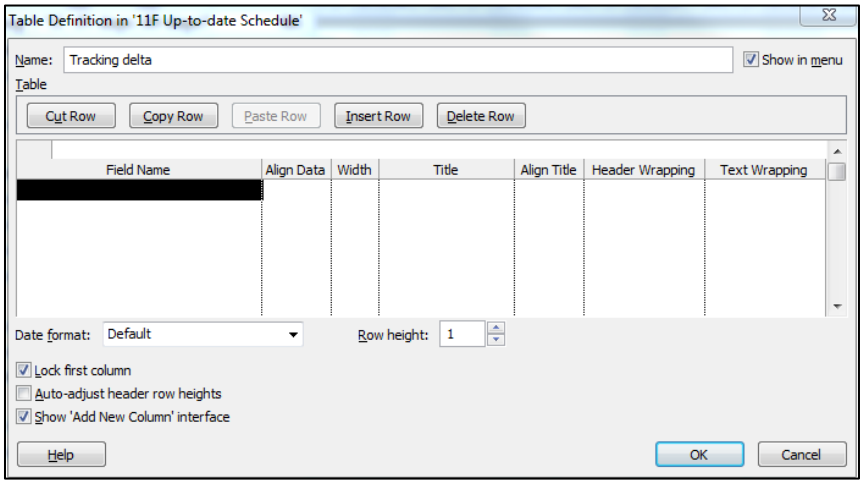
1. Design a new **Table**
2. Create a new **View** that displays the newly created Table.

Creating a Custom View

1. Open the demonstration file **Demo Lesson 10 Reports**.
2. Click ribbon **View**, in section Data click 

, click More Tables. In the More Tables dialog select the Tracking table and click 

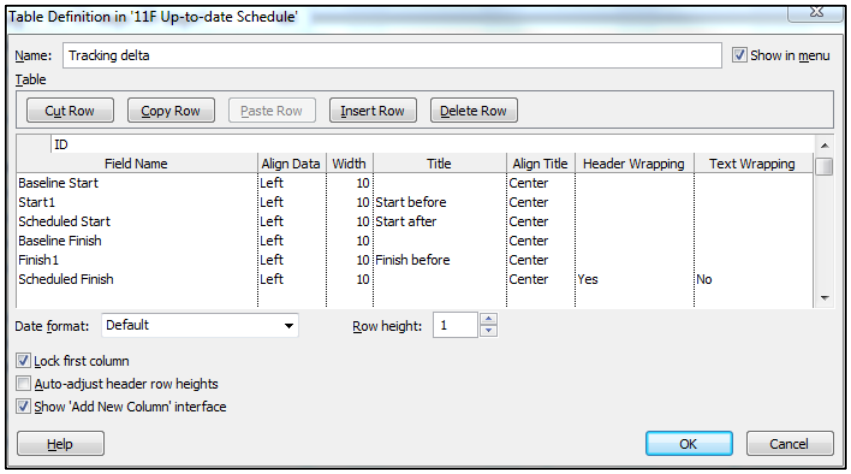
. The dialog box will appear.



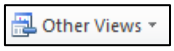
Enter the Field Names and Title data as follows:

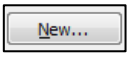
Field Name	Title
ID	
Name	Task Name
Baseline Start	
Start 1	Start before
Scheduled Start	Start after
Baseline Finish	
Finish 1	Finish before
Schedule Finish	Finish after

3. Your box should look like this:

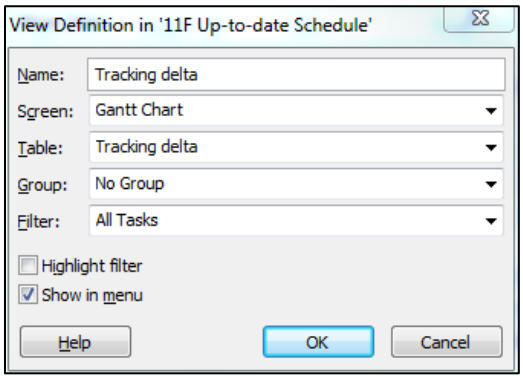


4. Click **OK**. Click **Close** on the **More Tables** dialog.

5. Click ribbon **View**, in section Task Views click 

, click **More Views**. In the **More Views** dialog select the **Tracking Gantt** view and click 

. Select **the Single View** option and click **OK**. The dialog for **View Definition** will appear:



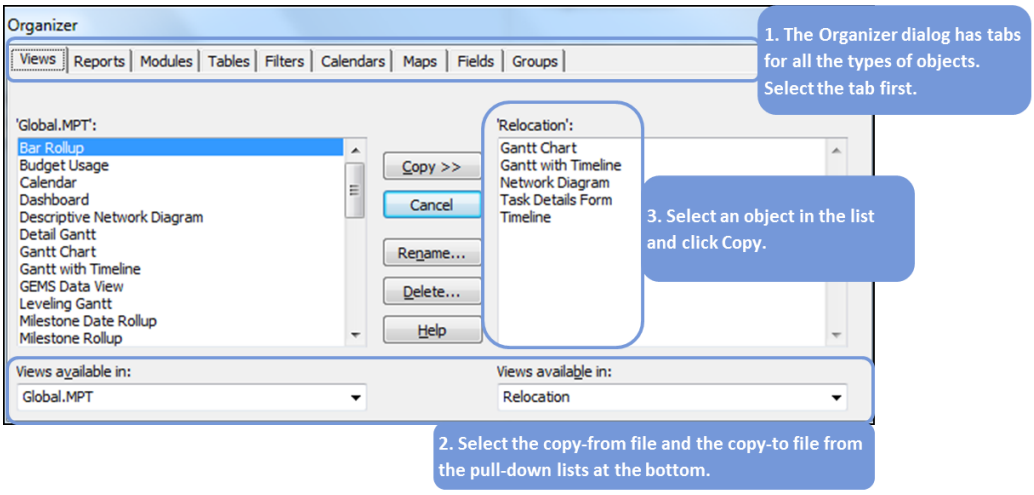
Enter the data to resemble the illustration above. Click **OK**. Click **Close** on the **More Views** dialog.

6. To display this view click ribbon **View**, click the bottom of **Gantt Chart** button, select item **Tracking delta**.

Copy Views to the Organizer

Once you have changed an existing view or created a new view object and formatted it, you can use it in all your other projects by putting it in your *Global.MPT* file. You can even share it with other people by giving them an MPP file containing the view object and all its components: fields, table, filter, and group objects.

1. Open the schedule that contains the object, and open the schedule into which you want to copy. You do not need to open the *Global.MPT*, as it is always open when MS Project is running.
2. Click the ribbon **File**, tab **Info**, button **Organizer…** - the Organizer dialog appears:



3. Activate the tab **Views** as the type of object to copy.
4. In the list **Views available in** on the left at the bottom of the dialog, select the schedule from which to copy the object; in a similar list on the right, select the schedule to which to copy.
5. Then select the view object to copy and click **Copy>>**.
6. Click the tab **Tables** and copy the table that the view uses.
7. Click the tab **Filters** and copy the filter objects that the view uses.
8. Click the tab **Groups** and copy the group object that the view uses.
9. Click **Close** when done or **Cancel**.

Exercise 10.1: Reporting for the Relocation Project – Executive Overview

Instructions:

The goal of this exercise is to be able to create custom, one-page reports targeted at executives.

Continue to work with your file *Relocation.mpp* or open *Exercise 10A.mpp*.

1. Click ribbon **View**, button **Tables**, item **More Tables…** and create a new task table named *Executive Overview*. Use the columns **ID**, **Name**, **Duration**, and **Cost**.
2. Click ribbon **View**, list **Filter**, item **More Filters…** and create a new filter, *Executive Overview*, to display milestones plus summary tasks.
3. Click ribbon **View**, list **Other Views**, item **More Views…** and create a new view, *Executive Overview*, which is based on a Tracking Gantt view. Select **Show in menu** to display it as an item in the list of **Gantt Charts** on the **View** ribbon. Make sure when you apply the view *Executive Overview*, the corresponding table and filter that you created are both applied.
4. Hide the question marks in the **Duration** column by clicking ribbon **File**, **Options**, tab **Schedule** and clearing the options **Show that scheduled tasks have estimated durations** and **New scheduled tasks have estimated durations**.
5. Click ribbon **View**, find its section **Zoom** and click the down arrow of the list **Timescale**, and select **Timescale:** Apply the following settings in the **Timescale** dialog:

		Middle Tier	**Bottom Tier**
Field	**Units**	Months	Days
	Label	Jan, Feb, …	1, 2, …
	Count	1	7
	Align	Center	Center
	Size	100%	100%

6. In the **Page Setup** dialog (ribbon **File**, tab **Print**, hyperlink **Page Setup**), format the **Header**, **Footer**, and **Legend** as follows:

		Section	**Set to**	**Font**
Tab	**Header**	Center	&[View] &[Project Title]	Arial, Bold, 20
	Footer	Left	&[Manager] &[Company]	Arial, Regular, 8
		Right	&[Date]	Arial, Regular, 8
	Legend	Legend on	select **None**	

7. Save your file and compare the view you created to the view called *Executive Overview* in *Exercise 10B.mpp*.

Exercise 10.2: Reporting for the Relocation Project – Cost by Function (Optional)

Instructions:

The goal of this exercise is to be able to create a custom cost report.

Continue to work with your file Relocation.mpp or open *Exercise 10B.mpp*.

1. Switch to the **Resource Sheet** view.
2. Click ribbon **View**, button **Tables**, item **More Tables…** and create a new resource-related table named *Cost by Function* that shows the fields **ID**, **Name** (the title of this column will appear as **Resource Name**), **Position**, **Function**, and **Cost**.

   Click ribbon **Project**, list **Group by**, item **More Groups…** and create a grouping *Cost by Function* so that you can easily read the total cost by resource function of the project.
3. Click ribbon **View**, button **Other Views** and select item **More Views…** and create a new view based on the resource sheet that is named *Cost by Function* (select **Show in menu**). The view should apply the corresponding table and grouping that you created.
4. Best fit the column widths (Right-click the column headings and click **Field Settings**; the dialog shows up. Click **Best Fit**).
5. In the **Page Setup** dialog, enter the following settings:

Tab	**Section**	**Set to**
Page	Orientation	Portrait
	Scaling	**Fit to:** 1 page wide by 1 tall
Margins	Top, bottom, left, right	1 inch or 2.5 cm
	Borders Around	Every page
Header	Center Arial, Bold, 20	&[View] &[Project Title]
Footer	Left	&[Manager] &[Company]
	Center	None; delete the default entry
	Right	&[Date]

6. Save your file and compare the view you created to the view called *Cost by Function* in *Exercise 9A.mpp*.

Lesson 10 Checklist: Best Practices for Reporting

- Is there a one-page status report for the schedule that is readily available as a separate View object? This can be one of the following:
    - A view that supports Earned Value Management
    - A view that displays only major milestones with their forecast dates relative to their baseline dates
- Does the one-page report give an appropriate impression of the health of the project?
    - If using Earned Value, verify that the schedule supports the Earned Value values. For example, if the Schedule Variance is positive, the schedule should show that the deadlines are easily met.
    - If using a milestone view, ask this question: are the right milestones chosen to represent the health of a large project?

Notes

APPENDIX 1 – SETTING OPTIONS FOR MS PROJECT

Set Options for MS Project

It is recommended that the following options be set when using MS Project. Access by clicking the ribbon **File**, click the **Options** button, and the Options dialog appears.

Tab	Applies To	Set to
General	**Setup**	Date format: Jan 28 '09
Schedule	**Setup**	Hours per day : 7.5 (enter by typing)
		Hours per week: 37.5
		Days per month: 20
		☑ Show scheduling messages
		Show assignment units as a : Decimal
		Duration is entered in: Days
		Work is entered in: Days
		Default Task type: Fixed Duration
		☐ New tasks are effort driven
		Calculate project after each edit: ◉ On
	WBS	Section **Scheduling options for this project:** **New tasks created: Manually Scheduled** or **Auto Scheduled**. Use **Manually Scheduled** if you create a draft or high-level schedule. If you create a detailed schedule use **Auto Scheduled**. **Default task type** Many people enter the duration immediately. If you do this we recommend setting this option to **Fixed Duration**. If you normally enter **Work** estimates, we recommend **Fixed Work** as the default task type. In this way you protect the estimates you enter. It is the default task type for new tasks you create. On a task-by-task basis you can still decide what type serves you best and switch the task **Type** to it. **New tasks are effort driven** (un-checked) This option changes the number of resources assigned (assignment units); we recommend you turn it off for **Fixed Duration** and **Fixed Units** tasks. It functions like **Fixed Work** tasks and we recommend you use the task type instead. **Fixed Work** tasks are by definition effort-driven and have this option always on.
	Estimates	Section **Scheduling options for this project:** **Duration is entered in:** MS Project will use the setting as the default time unit for the field *Duration*. With the default duration time unit set to days, you can type in 5 instead of 5d to get 5 days. You do not need to type a 'd' in the duration fields. Choose the unit that fits the majority of your inputs to save some keystrokes. The Duration field will display whatever time unit you entered.
		Work is entered in: Explanation is the same as for previous Duration field. Unlike the Duration field, the Work field will convert all entries to its default time

Tab	Applies To	Set to
		unit. If you switch the time unit, MS Project will convert all values.
		Show that scheduled tasks have estimated durations (checked) will add a question mark to the durations that you did not enter yourself.
		New scheduled tasks have estimated durations (checked) will add a question mark to durations of new tasks you may create.
	Dependencies	**Autolink inserted or moved tasks** should be on. This allows MS Project to set or break dependencies inside a waterfall chain of Finish-to-Start dependencies.
		If **Update Manually Scheduled tasks when editing links** is selected, MS Project will reschedule **Manually Scheduled** tasks. Three reasons linking **Manually Scheduled** tasks does not make sense: 1. A default duration of *1 day?* is entered for the task that does not yet have a duration. This removes the flexibility of **Manually Scheduled** tasks. 2. Links between **Manually Scheduled** tasks are *static dependencies* and only work when they are created. If changes happen the links no longer work. 3. If you do not switch to Auto Scheduled tasks you will receive many warnings that beg your attention.
	Resources	Section **Schedule:** **Show assignment units as a: Percentage** or **Decimal** Units of resources can be expressed as a percentage or in decimals in the resource-related **Max Units** field (availability) and in the assignment –related field **Units** field (workload). This is a global option and applies to all your projects, existing or new. For example, you have a resource that is available half-time to your project. This option
	Assignments	Section **Schedule:** **Show assignment units as a: Percentage** Percentage is the best choice when you have part-time resources. If there are mostly *team resources* (consolidated), **Decimal** is better, since "5 carpenters" is easier to understand than "500% carpenters". This option is a global option; if you change it to **Decimal** in one project, all your projects will use decimal numbers.
		In the **Scheduling options for this project** section**:** **Default task type:** Fixed Units Choose the type of task for any new tasks you create.
		New tasks are effort driven (unchecked): Using this option may result in MS Project changing assignment units. For now, turn it off.
	Updating	Section **Scheduling options for this project:** **Split in-progress tasks:** Checked Allows moving the uncompleted portion of a task to after the Status Date by splitting the task bar. With this option cleared, the options on the Advanced tab cannot split any task bars and will behave differently as a result. It is recommended selecting it.

Tab	Applies To	Set to
		Section **Scheduling options for this project:** **Updating task status updates resource status:** Checked Updating the tasks will update the actual work of the assignments. It is recommended you keep this option checked for task updates. Only clear it if you want to update the tasks and the assignments.
		Section **Scheduling options for this project:** **Actual costs are always calculated by Microsoft Project**: either checked or unchecked Updating the tasks will update the *actual cost*. It is up to you whether you want MS Project to do that. If you clear this option, you can enter the actual cost.
	Reports	Section **Scheduling options for this project:** **Show that scheduled tasks have estimated durations:** Unchecked Clear this if you want to hide the question marks in the duration field.
		Section **Scheduling options for this project:** **New scheduled tasks have estimated durations:** Unchecked Clear this if you want to hide the question marks in the duration field.
Advanced	**WBS**	Section **Edit**: **Allow cell drag and drop** (checked) This allows you to move or copy the selected cells by dragging the selected area by its border. With this option on, you can quickly rearrange your WBS by dragging tasks. This option is global across all your schedules.
	Estimates	Section **Display options for this project** **Minutes, Hours, Days, Weeks, Months,** and **Years** This allows you to change the way time units are shown in your project. The shorter you make the time unit, the more space you save. Select **All New Projects** first from the list if you want the short labels to be used from then on.
	Resources	**Section General Options for this Project:** **Default standard rate:** By entering a rate you can reduce the amount of typing you have to do. If the standard rate is set to $50/hr, you do not need to enter a rate for any resource that is $50/hr.
		Default overtime rate: By entering a rate you can reduce the amount of typing you have to do.
	Updating	Section **Calculation options for this project:** **Move end of completed parts after status date back to status date:** Checked This moves the actual duration bar to before the status date; actual work done is moved into the past. It is recommended you turn this on; it will help you keep the forecasts accurate. **And move start of remaining parts back to status date:** Checked The remaining duration bar will cuddle up to the status date (unless there are dependencies that keep it where it is). The choice is up to

Tab	Applies To	Set to
		you.
		Move start of remaining parts before status date forward to status date: Checked This moves the remaining duration bar to after the status date; work still to be completed is moved to the future. It is recommended you turn this on; it will help you keep the forecasts accurate. It has no effect on tasks that have not started yet, but should have started as per the status date. These tasks will still have to be rescheduled to after the status date to put them into the future where they belong. **And move end of completed parts forward to status date:** Checked or Unchecked This moves the actual duration bar to cuddle up to the status date. The choice is yours.
		Edits to total task % complete will be spread to the status date: Unchecked If a task is falling behind, the progress entered will be evenly spread to the status date. This option is only relevant if you enter % Complete, which is not recommended.
		Section **General options for this project:** **Automatically add new resources and tasks:** Unchecked This prevents a typo in a resource name from accidentally adding a new resource, and works similarly for tasks. It is recommended clearing it.
		Section **Edit:** **Allow cell drag and drop:** Unchecked This prevents accidentally dragging data on top of other data in your baselined schedule. It is recommended to clear this option.
	Reports	Section **Display options for this project:** You can change the time units for **Minutes**, **Hours**, **Days**, **Weeks**, **Months**, and **Years** to one character to save space on the screen.

APPENDIX 2 – BEST PRACTICES CHECKLIST FOR MS PROJECT

Best Practices Checklist for MS Project

Applies to	Checklist
Setup	Does the schedule contain a succinct description of the objectives or final product of the project? Use the field **Comments** (ribbon **File**, tab **Info**, button **Project Information** on the right side of the screen, **Advanced Properties, Summary** tab) which makes it a visible note on the project summary task.
	Do the business days, the working hours and holidays on the project calendar align with a typical, full-time resource on the project?
	Do the working hours on the Standard (Project Calendar) (ribbon Project, button Change Working Time) correspond to the Hours per day option (ribbon File, Options, tab Schedule)?
WBS	Are there deliverables in the task list? If there are not, the schedule does not have a WBS. Deliverables should be captured using nouns (maybe with adjectives, but without verbs).
	Is the list of deliverables complete, but lean?
	Are all expected deliverables explicitly included in the WBS?
	Are the project management deliverables, like schedule and budget included in the WBS?
	Are there only deliverables in the WBS that were explicitly agreed upon by the client or project sponsor?
	Does the WBS have a logical hierarchy?
	Is there one milestone for each deliverable?
Estimates	Do all tasks have an estimate? **Manually Scheduled** tasks: If one of the essential pieces of data is missing i.e. duration, start, or finish, the task is called *unscheduled* and is just a placeholder with its **Placeholder** field set to **Yes**. By filtering on this field you can easily check if you have entered all estimates. **Auto Scheduled** tasks**:** these tasks always have the three pieces of information, because MS Project will enter default durations of 1 day, if needed, and dates (the project start date as the default start date).
	Are the estimates that you collected consistent with the working hours entered in the Standard (Project Calendar)? If they are not consistent the schedule will be too long or too short. Gross working time estimates should be entered in a schedule with gross working hours on the project calendar (typically 8:00 AM – 5:00 PM). Pure working time estimates should be entered in a schedule with the pure working hours on the project calendar – a shorter working day. If you estimate that the productive hours are 70% of the time spent at work, the working hours should be 70% * 8h = 5.6 hours, rounded to 5.5 hours. Working hours correspond to this are, for example, 9:00 AM – 12:00 PM and 1:00 PM – 3:30 PM. It is recommended that you set the working hours like these on the project calendar if you want to work with pure work time estimates.

Applies to	Checklist
	Are the *estimates* reasonable given the work that needs to be performed? Some types of tasks are easily underestimated; for example, writing documents takes a lot of time, at least 2 hours per page. For other tasks, you will need some subject matter expertise to verify the estimates. Sometimes estimates are overestimated. Some project managers incorporate waiting time into duration estimates. Waiting time is more appropriately modeled as a lag on the dependency. Reviews or approval cycles include waiting times.
	Is the amount of effort on overhead tasks reasonable compared to the total amount of effort (Work)? The percent of overhead effort needs to be between 10% and 30% of the total effort in the project.
Dependencies	Have you turned the **Task Mode** of all tasks to Auto Scheduled?
	Is the network of dependencies complete?
	Is the network of dependencies correct?
	Is the network logic simple enough?
	Does the resulting high-level schedule make sense?
	Have you turned off **Autolink** after checking the network?
Deadlines	Is the project deadline date captured in the schedule? The deadline or constraint date for this should be set on the project finish milestone. A constraint date should only be used if the project target finish date is a very hard date.
	Are deadlines used to capture target dates on milestones that are promised to clients? Are deadlines used to capture agreed upon dates?
	Does the schedule have as few constraint dates as possible?
Resources	Are all the resources identified in the **Resource Sheet**?
	Are all resources named consistently using a naming convention?
	Is the availability of the resource appropriately modeled?
	Do all resources have their **Type** field set right?
	Are the rates entered in the appropriate fields?
Assignments	Are you using the task-related field **Type** for **Auto-Scheduled** detail tasks?
	Is **Effort-Driven** off for **Fixed Duration** and **Fixed Units** tasks (Auto-Scheduled)?
	Are there no assignments on the summary tasks?
	Do all detail tasks have a human resource assigned?
Updating	Is the baseline schedule present, complete, correct, relevant, and challenging?
	Are the appropriate options selected in ribbon **File**, **Options** for the chosen updating strategy?
	Is the **Status Date** set to an appropriate date?
	Is the task type for soon-to-be-updated tasks set to **Fixed Units** and **not Effort-Driven**?

Applies to	Checklist
	Are all actual durations scheduled in the past when they actually happened?
	Are all remaining durations scheduled in the future when they will happen?
Reporting	Is there a one-page status report for the schedule that is readily available as a separate View object? This can be one of the following: • A view that supports Earned Value Management • A view that displays only major milestones with their forecast dates relative to their baseline dates
	Does the one-page report give an appropriate impression of the health of the project? • If using Earned Value, verify that the schedule supports the Earned Value values. For example, if the Schedule Variance is positive, the schedule should show that the deadlines are easily met. • If using a milestone view, ask this question: are the right milestones chosen to represent the health of a large project?

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